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AUGUST 1985

VOLUME 3
ISSUE 8

THE INDEPENDENT GUIDE FOR APPLE COMPUTING

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- VIDEOWORKS
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- PUBLIC-DOMAIN SOFTWARE
- MACPAINT TIPS

DOT MATRIX

REVIEW OF 15 LEADING PRINTERS

LEISUREWARE: SUMMER APPLICATIONS

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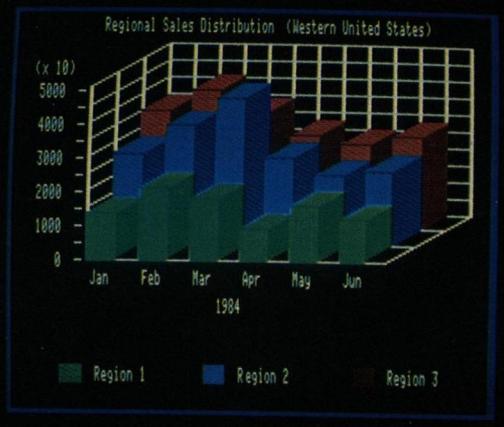

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VOLUME 3/ISSUE 8/AUGUST 1985

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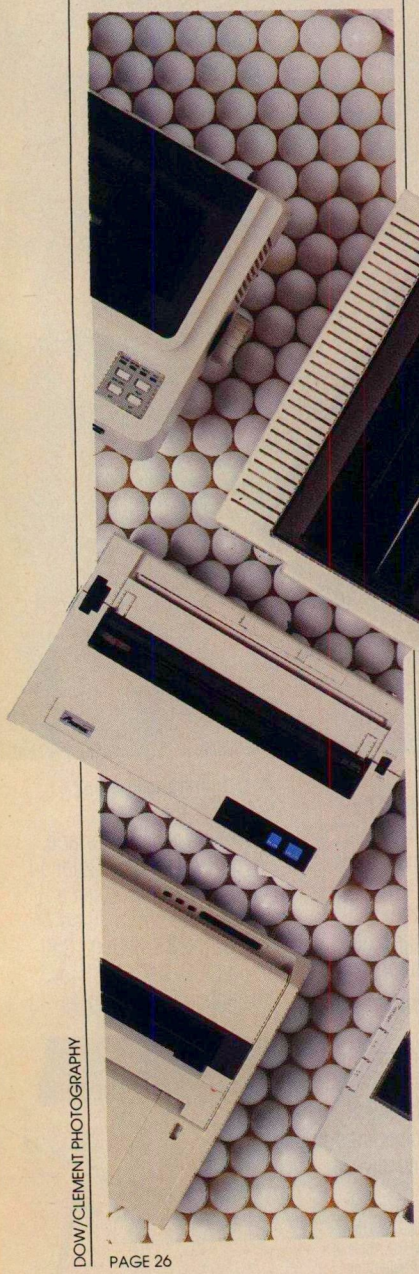

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By David Townsley and Francesca Venning-Townsley

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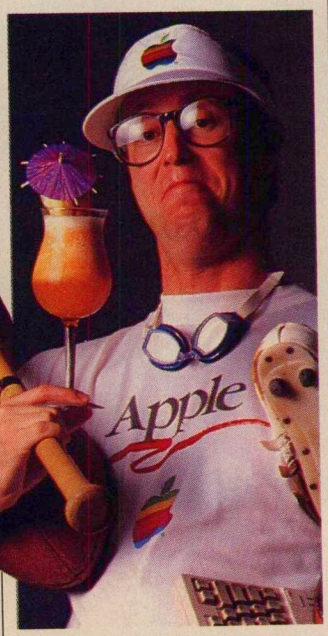

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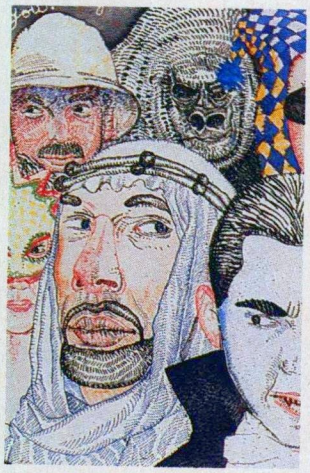

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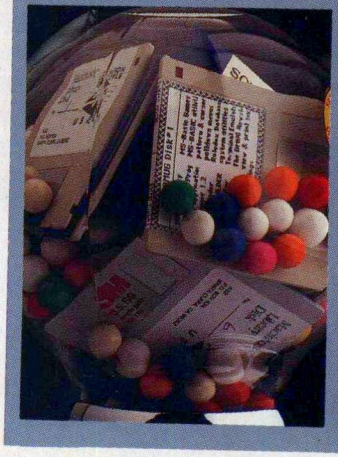

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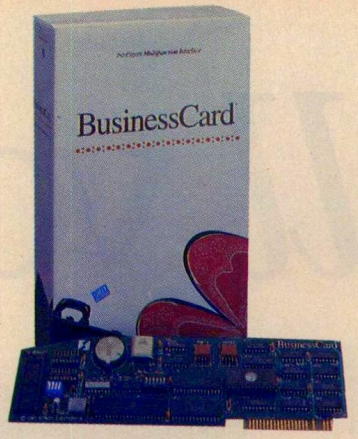

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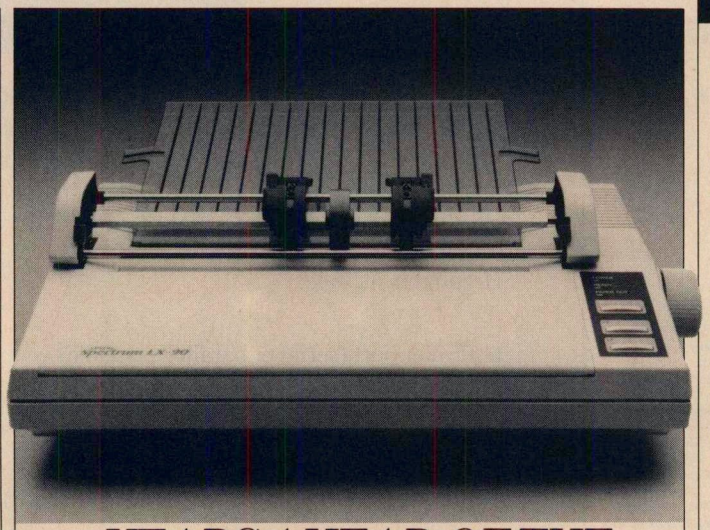

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L.A.R., 29 Palms, CA

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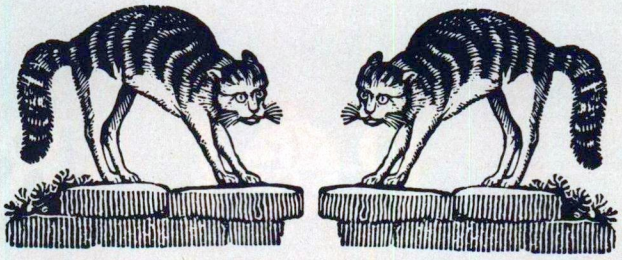

Recently in Martinez, California, two cats knocked an Epson printer 4 feet onto a tile/concrete floor. Although it didn't land on its feet, the printer is still running.

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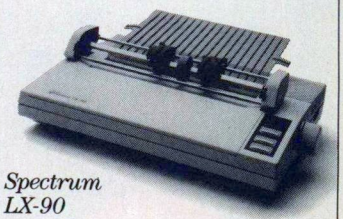

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Penguins rarely avoid water hazards when playing golf.

Discover 'leisureware' for your summer computing, and join a treasure hunt for the first 100 Apples.

THE PURSUIT OF FUN AND EARLY APPLES

We all know some people who have absolutely no sense of fun. Still, we felt confident in our readers' perspicacity when we decided to make summer fun the theme of this month's issue. Computer users have been known to take computing a bit too seriously, but I've noticed that Apple users consistently find interesting and fun ways to use their computers. After all, many of the first programs developed for the Apple II were games, and the Macintosh certainly makes computing easier and more fun, even for those more-serious tasks.

Our search for amusing ways to use your computer yielded quite a few interesting items. John Barry, in his article "Leisureware" came up with a new software category. "Leisureware" can be just about any software that's not business-oriented, covering topics that range from baseball statistics, to gardening, to bartending.

Our steadfast Steve Rosenthal, in his "Thoughtware" column, has some suggestions on how to vacation and travel with your indispensable Apple computer.

To add to the fun, we thought it would be interesting to find as many of the original Apple computers as we could. As you will see when you read Vanessa Schnatmeier's article "In Search of Early Apples," finding the first ten Apples was a much tougher assignment than we had anticipated. Who better to turn to for help in finding these elusive grandparents than all of you Apple owners out there? We're now looking for any Apple I or II with a serial number under 100 (we've broadened the field a bit), and we will give you a certificate and a token of appreciation for finding one of the original 100 Apples.

I have decided to take this treasure hunt even one step further. Find an example of a unique application (nothing risqué, please) and send it to me. I will then pick what I believe to be five of the most unusual submissions to include in a column.

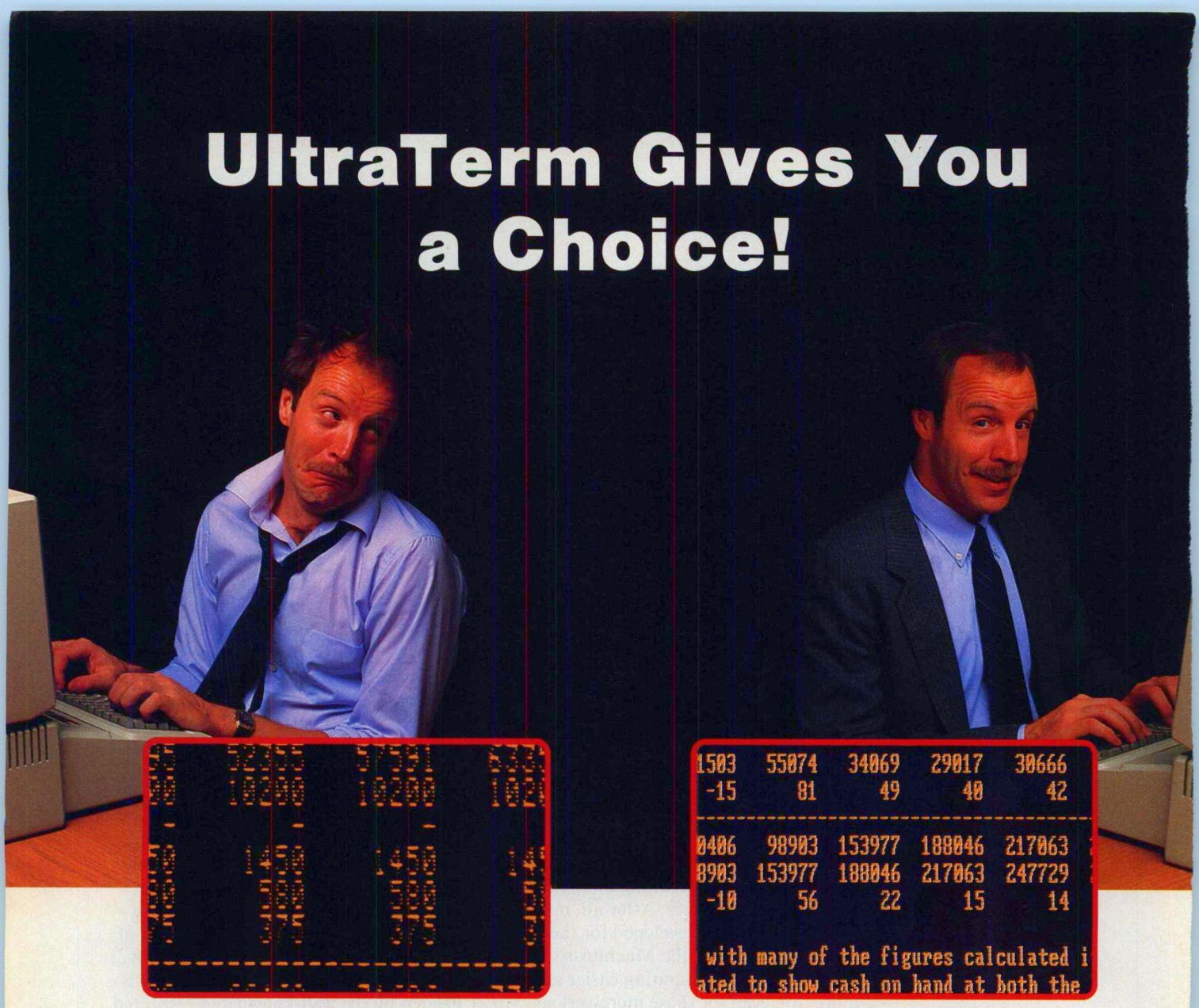
For *A+*, this summer also brings changes. Two members of the editorial staff are moving on and up in the world. Our intrepid senior editor in charge of features, Jane Willson, has accepted a position as associate managing editor of Ziff-Davis' exciting new product, *The Computer Industry Daily*. *The Daily* is headed by the well-known and respected industry analyst, Esther Dysan. Candy De Santis, our exuberant assistant editor, is going to Apple Computer, Inc., where she will work with Apple University. Both Candy and Jane have been with us since we started, and we are indebted to them for their invaluable contribution in helping *A+* become the number one Apple magazine. We wish them much luck in their new endeavors.

Departures usually mean that new people arrive, so I am pleased to introduce the newest member to the *A+* team. Chip Carman has been working for us for nearly a year as a technical consultant. We are delighted to welcome Chip as a full-fledged member of the staff. +

Maggie Canon

MAGGIE CANON/**EDITOR**

UltraTerm Gives You a Choice!



Apple //e 80×24 display

UltraTerm 128×32 display

Which display would you choose? The UltraTerm's display is clearer, crisper and easier on your eyes than the standard Apple //e's 80-column display. Something you'll appreciate the next time you have to spend long hours working with your computer.

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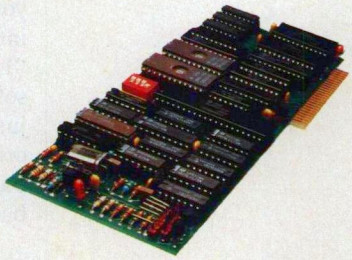
There is also a wide choice of popular programs that can take immediate advantage of the UltraTerm's expanded display.

Programs like MultiPlan, Word Juggler //e, WordStar, FlashCalc and SuperCalc to name a few*. Videx also has pre-boots available for AppleWorks, AppleWriter //, and VisiCalc.

And now, UltraTerm works with most monitors to give you the best display possible for your eyes, and your piece of mind. Contact your dealer today for a demonstration.

*Complete list of compatible software available from Videx, upon request.



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CIRCLE 142 ON READER SERVICE CARD

LETTERS TO THE EDITOR

IIe ENHANCEMENT

Dear *A+*,

I just finished reading the April issue of *A+*, and I found the article "Is There a IIc in Your IIe?" most interesting. I thought that the article could have been a little more specific or detailed. I bought my second Apple IIe March 8, and it did not have the enhancement feature. After reading your magazine, I was not sure whether or not my new Apple should have had the new feature. The article stated that "as of March, every new Apple IIe has these four chips in place of the old ones. Owners of earlier incarnations of the IIe can get them installed at a dealership for about $70. (All installations are made by dealers. You *cannot* take the chips home and install them yourself.)" I was not sure when the cutoff date was in March on the enhancement feature. An Apple technician told me that the cutoff date was the first of March. I immediately contacted the other Apple dealer from whom I'd purchased the IIe and told him about my new Apple not having the enhancement feature. When he told me to bring in my entire system and he would exchange it for one with the new feature at no charge, I was delighted.

Thanks to the article, I was made aware of the feature. Had it not been for your magazine, I probably would not have the new feature now. I figure that your magazine saved me $70 in the upgrade cost, which more than offsets the amount of the subscription.

Another minor fault in the article was regarding the chips. According to one Apple dealer, I could have gotten the upgrade chips from him and put them in myself. Even though the dealer said that there was really nothing to it, I declined.

I wish that the article had been more detailed. I was always under the impression that the journalists who wrote these articles had the equipment or knew of someone who tested it, and were there when it was tested. I surely hope that these journalists are not just deriving pleasure from the manufacturer's specifications when writing these articles.

Robert P. Johnson
Twin Lakes, WI

We're glad that you found our April story about the IIe enhancement helpful. The reason that the article was not more specific is that Apple did not provide us with the official details about the IIe enhancement; we wrote the article when Apple was keeping this information secret, and our author had to do some behind-the-scenes work to piece together the article. Now that Apple has formally announced the product, we have more information about the IIe enhancement. "A Close Look at Recent IIe Enhancements," starting on page 45 of this issue, will fill you in on more details about this new development for the IIe.—Editors

DISAPPOINTED IN IIc LCD

Dear *A+*,

I am a proud owner of an Apple IIc that I use for work as well as pleasure, but I have a complaint that echoes Frederic E. Davis' comments in your May 1985 issue on the new IIc LCD flat-panel display.

I bought the machine last year because of the wonderful reputation that Apple has earned and since I needed a portable computer that could eventually be used during business trips (with the anticipation of adding the flat-panel display upon its release). For those of us who travel frequently by air or train—often internationally—a small portable computer is a great investment that eliminates a lot of otherwise useless travel time.

After examining the new LCD unit on display, I feel that I am only one of thousands of Apple IIc users who are not only disappointed but also disgusted at Apple's attempt to sell us an inferior add-on at such a ridiculous price. Does Apple actually believe that the same people who made an intelligent decision to buy an Apple IIc will buy this new LCD display? Come on Apple, go back to the drawing board and design the type of product your valued customers have come to expect from you . . . a good one!

Jerry C. Drew
Dallas, TX

MORE ON MUSIC

Dear *A+*,

Your recent articles on music (November 1984) and speech (May 1985) are very efficient summaries of the hardware and software available and are surely a help to all who read them.

Your readers might be interested to know that there is hardware compatibility between the board provided with Software Automatic Mouth (Tronix) and the Micro Music DAC board, which supports the Micro Music Software library. Buying either hardware unit (S.A.M. is the less expensive of the two) will allow you to run S.A.M. speech programs and Micro Music disks. As author Steve Rosenthal pointed out, the S.A.M. board terminates in bare-wire ends. I simply cut an RCA patch cord (phone jacks on both ends) in half and spliced it onto the wires coming from the board. On my board, the gold wire is the ground, and it was patched to the outer portion of the RCA plus (the silver is connected to the volume-adjustment port, so that must be the "hot" side).

Though the S.A.M. board is not extremely powerful, it drives a small speaker adequately, and it does a satisfactory job through headphones. It is certainly a low-cost alternative method to access the music software.

Marc Apfelstadt
Greensboro, NC

P.S. Readers may want to confirm my suppositions as to the identity of the ground wire—wouldn't want anyone "hot-wired" because of me!

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Degrees available through the Electronic University include: Associate Degrees in Business and General Studies, Baccalaureate Degrees in Business and the Arts, several MBA Degrees, and specialized Certificate Programs. There is also a variety of non-credit courses offered over the system, as well as Tutoring Programs for children.

Isn't it time to involve yourself in education once again? Have some fun, become part of the spirit of a national university system, and better yet, open up a world of new opportunities for yourself and your entire family. *Call us today:*

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IIc COMMUNICATIONS

Dear *A+*,

I just finished reading Mark Andrews' article "The IIc Communications Gap," in the May issue of *A+* (pages 73–75) and felt compelled to share my experiences with you.

I was an excited Apple IIc customer in May 1984 and bought one of the first IIc's in my area. After learning to use the machine, I decided to add a modem and begin telecommunicating. I had nothing but raves for Apple until I bought the Apple Modem 300 and added it to my shiny new IIc!

The IIc and Apple Modem 300 combination was able to deliver only occasional lines of error-free text! It was suggested that causes for this poor operation were bad phone lines (my line is on a new electronic switching system, so that made no sense) and even atmospheric conditions affecting microwave long-distance lines. Neither suggestion was good or rational, because errors continued even on very clean local loops. My first experiences were frightful and discouraging. I was very upset about having spent a couple of hundred dollars to get such poor performance.

Then one day, quite by accident, I was having a discussion with one of the Apple dealer reps and he suggested the motherboard exchange. He said that Apple would "pay" the dealer for this work if I was using a non-Apple modem and that since I had an Apple Modem 300, he would "work something out." So, I got a new motherboard installed by the dealer, at Apple's expense, and took it home—my problems were gone! The local dealer was great for performing the work for me, and I have had no problems since the swap.

Your article really hit a sensitive spot for me, because of all the Apple-specific problems I have had and what Apple is apparently saying about them. As a service manager for an electronic-equipment manufacturer, I know what it's like when there is a technical problem as a result of a design oversight. I also know how it affects a customer's perception of the product and the company. I have determined that the only thing a reasonable company can do when things like this happen is to admit the error and correct the problems. Customers will naturally become upset because of factory problems, but they respect a dedicated effort to correct the problems. Trying to say you don't have a problem when you really do doesn't cut it with an irate customer, and it didn't take me months of testing to

CIRCLE 301 ON READER SERVICE CARD

know that I had a very real problem, with a bit of political football (I now find out) for an answer. Come on now, Apple, who are you trying to fool?

Thanks for the enlightening article and for not being afraid to call it straight. The IIc and Apple Modem combination make a terrific communications system. Now that my machine has been updated with a new motherboard, I am having a great time exploring the world of telecommunications. Other IIc owners should not let these problems stand in the way of buying a modem, Apple or otherwise, for the IIc.

Dave Montgomery
Bloomington, IL

ANOTHER VOICE—SYNPHONIX

Dear *A+*,

Missing from the article "Season'd with a Gracious Voice," in the May issue, is the SynPhonix voice.

I have been using SynPhonix for several months; it is the only speech articulator for Apples that has not caused the reaction "What did it say?" Previously I used the Echo+ and have researched the Intex-Talker, Mockingboard, and Votrax models.

One of my needs was the capability to talk and do graphics at the same time, which SynPhonix accomplishes through the use of interrupts, except for disk operations. It can also make music and sing, but not dance.

It speaks with a slight nasal quality, but by far is the most understandable speech synthesizer I have heard for the Apple.

SynPhonix is made by Artic Technologies, 2234 Star Court, Auburn Heights, MI 48057; (313) 852-8344.

Max Ward
Santa Barbara, CA

CORRECTIONS

Mockingboard

Sweet Micro System's Mockingboard sells for $179, not $219 as stated in Steve Rosenthal's article "Season'd with a Gracious Voice," in our May issue.

MouseTrace

In the "Pipeline" section of our June 1985 issue, we incorrectly listed Village Computer Resources of Lakewood, CA, as the developer of the product Mousetracer. Village Computer Resources' product is MouseTrace, and it sells for $99. (See this month's "Pipeline" for corrected information about both products.)

BETTER THAN RAMWORKS™

MultiRam™ (formerly MaxiRam) offers everything Ramworks does and adds much more with unlimited future use & less power drain. **AVAILABLE NOW** for both the **IIe** and **IIc** at lower cost from Coit Valley Computers:

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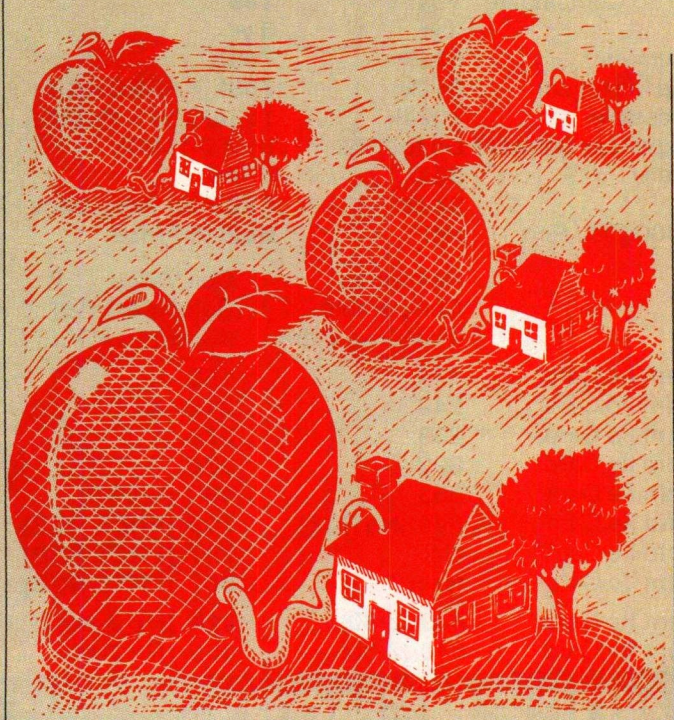
CIRCLE 340 ON READER SERVICE CARD

NEWS+

BY FREDERIC E. DAVIS



HOW SMART IS YOUR HOME?

Is your house smart enough to water the lawn or turn off your hot-water heater when you don't need it? Is it smart enough to call the fire department or police department in case of a fire, burglary, or other emergency? Now, with the help of an Apple-II-series or Macintosh computer and a product called Smarthome, you can have the most intelligent house on the block.

The Smarthome home-control and security system from CyberLynx has proven so popular that several housing developments around the country have adopted it as a feature of their homes. Lancashire Homes, a 200-unit development in the Antelope valley, north of Los Angeles, was the first to offer Smarthome and an Apple as part of the purchase price of a new home.

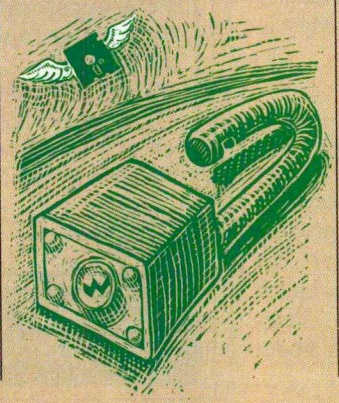
Smarthome is also available as a peripheral product for your Apple, and, since it runs in the Background mode, you can still use your computer for all of your other work. For more information, contact CyberLynx, 4828 Sterling Drive, Boulder, CO 80301; phone (800)-SECURE9 or, in Colorado, (303) 444-7733.

COPY PROTECTION

Before microcomputers arrived on the computing scene, software copy-protection was unheard of. The prevailing custom was to make a copy of your software as soon as you received it, put the original in storage, and use only the copy. With the advent of microcomputers and low-cost software, however, many companies have devised ways of inhibiting the copying of software.

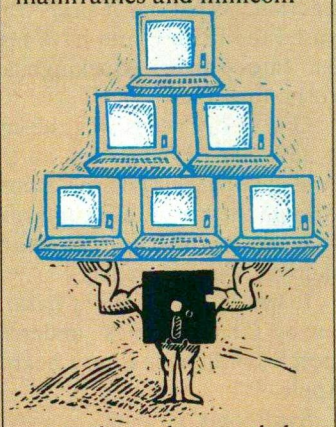
I personally don't like copy-protection, because it makes it difficult or impossible to create backup disks or to use protected programs on a hard disk, RAMdisk, or other nonstandard storage device. Whenever I have a choice between two programs, one of which is protected and the other is not, I choose the unprotected one. In fact, in a business setting, you must be able to back up your program diskettes. Imagine not being able to collect your bills or file your tax reports because someone has spilled coffee on the only copy of your program.

Because of protests from users, some companies are no longer copy-protecting their software. Stoneware has removed the copy-protection from DBMaster, MicroPro has removed it from WordStar, and Forethought is removing it from FactFinder and FileMaker. If we want this trend away from copy-protection to continue (and I know I do), we have an increased responsibility not to violate the trust these companies are putting in us: Do not copy disks for purposes other than creating backups for yourself.



SITE LICENSES

One of the hottest topics of discussion in the microcomputer industry nowadays is the issue of site licenses. A site license is a license to copy a software package for all the computers at a particular site. This issue is of particular concern to government agencies, corporations and educational institutions that have many microcomputers at a single location. Site licenses are common in the world of mainframes and minicomputers, but only recently has the personal-computer industry begun to take a hard look at the issue of site licenses for microcomputer software.



The subject of site licensing is bitterly disputed. Those who are against site licensing fear loss of revenues and promiscuous copying of their software. The advocates of site licenses, on the other hand, say they need licenses to make using microcomputers cost-effective at all.

For example, a large corporation with 1000 micros would have to pay a quarter of a million dollars to outfit each computer with $500 worth of software, even as-

suming the programs were bought at a substantial 50% discount. This high cost makes it cheaper to use minicomputers or mainframes. A site license would allow an organization to pay a flat fee to buy one copy of each program for internal distribution and use. Two companies that have taken the lead in the Apple market are Sorcim/IUS, which offers a site-licensing arrangement for its new SuperCalc3A program, and DeskTop Software, which offers a site license for its Macintosh database 1stBASE.

I think site licenses are critical to the future growth of the personal-computer industry; if software companies make it too expensive to use micros, they will be cutting their own throat in the long run by making it cheaper to use large, multiuser computers.

MAC TAPS INTO LEXIS/NEXIS

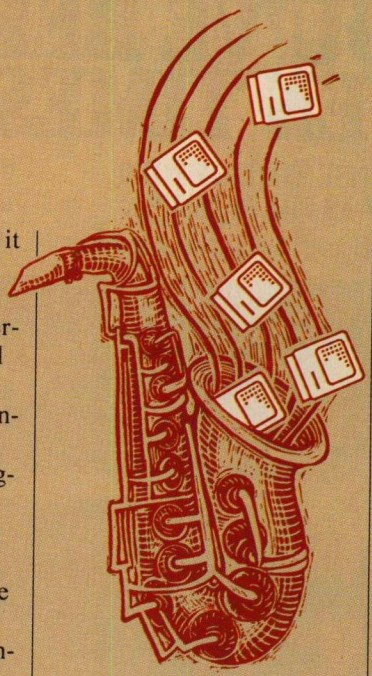
Information is the lifeblood of American business, and better access to information can help businesspeople make more informed business decisions. Recently Mead Data Central announced Lexis/Nexis Communications Software for the Macintosh that makes it easier to access the Nexis news retrieval service and the Lexis legal-research service and to save and recall search results.

The Nexis database contains the full text of more than 135 newspapers, magazines, wire services, and newsletters, in addition to SEC filings and research reports from top brokerage and investment-banking firms. Lexis is an on-line information service that covers case law, statutes, codes and regulations, and other information of interest to attorneys. For more information, contact Mead Data Central, P.O. Box 933, Dayton, OH 45401; (800) 227-4908.

MAC MUSIC MANIA

MusicWorks, the innovative music-composition program from MacroMind, has started a revolution in music technology and in Macintosh software. Previously, you pretty much had to have a piano in order to compose music. Now, with the advent of programs such as MusicWorks, you can use the Macintosh as an effective composition tool.

MusicWorks, although it's a great program, has a few shortcomings. But have no fear, new software is near. MacroMind is planning a new, improved version of MusicWorks; Great Wave Software has a nice program called ConcertWare Plus; and Electronic Arts is preparing a Deluxe Music Construction Set for the Macintosh computer that is far better than its counterpart on the Apple II series.



The next phase of development for music software on the Mac will be to produce programs that work with MIDI-compatible electronic instruments. MIDI, which stands for Musical Instrument Digital Interface, has been adopted as a standard for controlling electronic instruments by many manufacturers, including Roland, Yamaha, and Casio. Rumor has it that several companies (including Assimilation, of Mac Turbo Touch fame) will be marketing low-cost MIDI controllers for the Macintosh in the near future. These developments could well make the Mac the computer of choice among musicians.

SPREADSHEET WARS HEAT UP

Electronic spreadsheets such as VisiCalc helped get the microcomputer industry off the ground. VisiCalc was the first superstar spreadsheet, and Lotus 1-2-3 was the second. Both of these programs have inspired numerous clones. Even Steve Wozniak of Apple II fame wrote a knock-off of VisiCalc called WozCalc, which he donated to an Apple users' group.

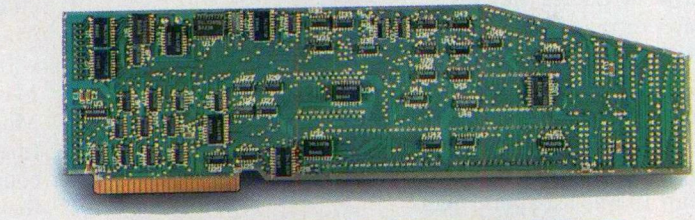
Now the battle to create superior spreadsheets for the Apple is heating up again. This time around, the major players are Lotus with Jazz for the Mac, MicroSoft with Excel for the Mac and Multiplan for the Mac and Apple II series, Paladin with Crunch for the Mac and FlashCalc for the Apple II series, VIP with VIP Professional for the Mac and II series, Apple with AppleWorks for the II series, Sorcim/IUS with SuperCalc3A for the II series, Version Soft with Mouse Calc for the II series, and Software Publishing with PFS:Plan for the II series. We're keeping our eyes on these programs and will be bringing you in-depth coverage of some of these packages. +

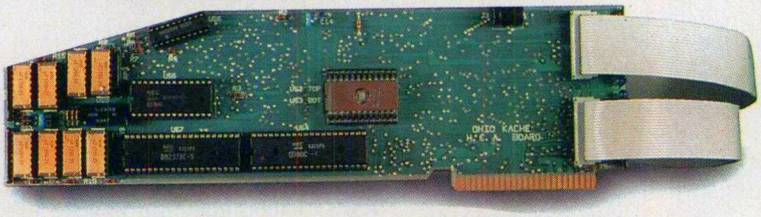
CRISTINE MORTENSON

THE KACHE BOARD GIVES YOU WHAT YOU'VE BEEN WAITING FOR TEN TIMES FASTER.

SPEED UP THE RESPONSE TIME OF YOUR MICROCOMPUTER BY AS MUCH AS 10:1.

Ohio Kache System's™ "Kache Board"™ effectively reduces the frequency of hard disk accessing, and consequently, the cause of most "waiting frustration"—mechanical latency. Apparent response time can be reduced by up to ten times since data requested already resides in cache memory. The Kache Board features a microprocessor that actually manages the operation of the cache memory buffers without drawing on your microcomputer's main processor. Data in cache memory is constantly purged to maintain 256K of the most frequently accessed data, combining the speed of RAM disk with the capacity of hard disk.





THE KACHE BOARD IS SUPERIOR TO RAM DISK.

The Kache Board offers performance that is superior to RAM disk for three primary reasons: data is automatically updated on the disk as it is changed, minimizing its vulnerability; data fetching from disk is transparent, eliminating the need to copy files; and cache memory retains only those files that are most frequently accessed, ensuring the greatest possible reduction in hard disk accessing.

SYSTEM COMPATIBILITY.

To date, the Kache Board is only compatible with Apple II+ and IIe systems with hard disk drive; however, boards for IBM, AT&T and Texas Instrument microcomputers are already in final testing stages and will become available later this year.

TECHNICALLY SPEAKING.

The Kache Board, a host adapter, is compatible with most Small Computer Standard Interface (SCSI) hard disk drives. Management of the cache memory buffers is carried out by a Z80 microprocessor which draws its power from an outside, custom tabletop power source (available as an optional purchase). Heat dissipation from the board amounts to approximately 6 watts.

SURFACE MOUNTED DEVICE TECHNOLOGY.

The functionality and intelligence of the 11" x 3¼" Kache Board is made possible by the technology of Surface Mounted Devices (SMD's). SMD's, tiny integrated circuits a fraction of the size and weight of conventional devices, are mounted on the underside of the board in a highly concentrated schema. This allows room on the top side of the board for the microprocessor, memory chips, custom integrated circuits and other components that, to date, are not available in SMD proportions.

EASE OF INSTALLATION.

The Kache Board is easy to install and can reside in any one of four slots: 4, 5, 6 or 7. In addition, a cable is provided for ease of installation to your 50 pin SCSI disk connection. The self-contained power source plugs into the Kache Board and relays power from any standard 110 volt electrical outlet.

AVAILABLE FROM MANUFACTURER ON A DIRECT MAIL BASIS.

The Kache Board is available from Ohio Kache Systems (OKS) on a direct mail basis only. A rigorous 48 hours of testing is completed on every unit prior to shipment. Nonetheless, Ohio Kache Systems offers a 90 day warranty on all components and labor as well as a 30 day trial period. If the Kache Board doesn't perform as we say it will, return it to us for a full refund.

ORDER TODAY

The OKS Kache Board comes complete, ready for installation in your Apple IIe or II+ for $695.00. You can order yours by calling toll-free: **800-338-0050**

Phone orders may use Visa or MasterCard. To order by mail, write to the address listed below. For faster service use Visa, MasterCard, bank or certified checks. Please allow 18 days for delivery of shipments accompanied by money orders, company or personal checks.

Kache Board (256K)	$695.00
Optional Power Source	$35.00
6 Ft. Shielded, 50 Pin Extension Cable	$40.00
6 Ft. Non-Shielded, 50 Pin Extension Cable	$30.00

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Prices include shipping and handling. Ohio residents please add 5.5% sales tax.

For further information on the Kache Board, Ohio Kache Systems Corp., or the compatibility of your hard disk drive, please contact us at (513) 746-9160.

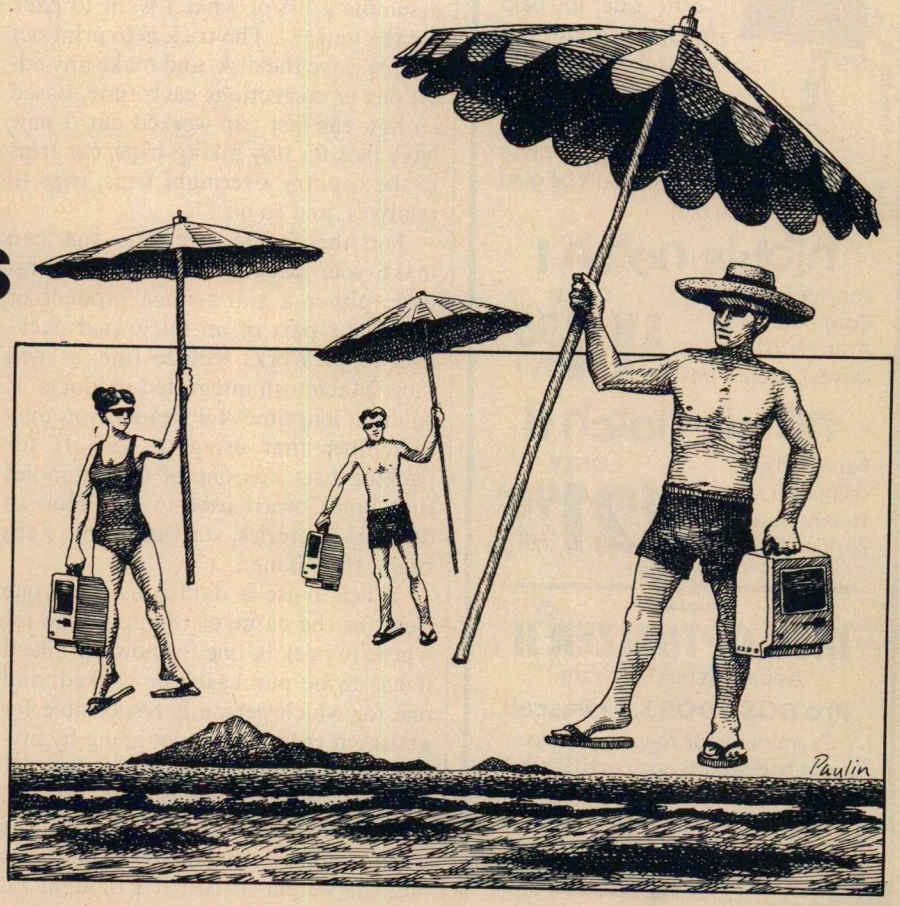
Ohio Kache Systems, Corp.
75 Tahlequah Trail, Dept. 11,
Springboro, Ohio 45066-1154

OKS

CIRCLE 178 ON READER SERVICE CARD

THOUGHTWARE
BY STEVE ROSENTHAL
Your Apple can flavor your summertime activities.

OFF-SEASON APPLICATIONS



Let's face it: Many of summertime's most pleasurable activities don't depend on a computer. Summertime is the season to get out of the house, go for a trip, head for the park, or go for a swim. But before you put away your Apple until the first frost, take a look at some of the ways that a computer can play a supporting role in your hot-weather fun.

Just as during the rest of the year, you can use an Apple as a tool to help you get chores done faster, or you can use it as a source of entertainment. Even if you're taking the summer off from school, you might still want to use your computer for some special learning projects.

If traveling is part of your summer plans, you may or may not want to take your computer with you. Of the Apple family, the Mac seems to travel the best, the IIc a close second. Although the IIc is smaller, I've found the IIc power transformer, screen, and a monitor more trouble than the Mac's keyboard and mouse—and the IIc LCD screen is still not good enough for my taste. The number of items and cables to set up is usually a more important factor than the precise size of the box.

Are you thinking of setting your computer up on a picnic table or even in a hotel room? Don't forget to bring a long, grounded extension cord. If you're planning to work outdoors or near a pool, you definitely should use a ground-fault interrupter (GFI) shock-protection device as part of your power connection. These units cut off power in a fraction of a second if they sense that electric current is escaping through some other path, rather than returning to the outlet. You probably won't have a problem with an Apple, but if something does go wrong and you're part of that path, you want the power shut off in much less than a heartbeat.

If you're going abroad, be sure to check into what you need to temporarily run your Apple on the type of power supplied at your destination (see "Taking Your IIc to Europe" in the January 1985 issue of *A+* for a complete discussion).

Before you put away your Apple until the first frost, take a look at how it can play a supporting role in your hot-weather fun.

The Light Fantastic

Either at home or on the road, summertime means longer daylight hours. When the light is bright, even indoors in a sunny room, you'll probably need some kind of antiglare screen to cut down the reflection from the external world that bounces off the CRT screen. A nylon-mesh antiglare screen will help, but a coated or polarized filter will do even more to limit reflection. Otherwise, you'll find yourself squinting at a dim undertone of the computer image on what looks like a slightly curved mirror. I've found draping three sides of a cardboard box around the screen helps both to keep the glare of direct sun off the screen and to keep my computer from frying. On a hot day, you'll certainly need to keep your Apple out of direct sun, a precaution also necessary for any floppy disks.

Before you go, be sure to make a practice journey, even if it's to another room of the house, to see what you really need to set up your system in a new location. Then make a checklist of what you need to take, with space both to check that it goes with you and also to

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CIRCLE 263 ON READER SERVICE CARD

check off that you've packed it all up again for the trip home.

Check That List

Making packing lists before taking even a one-day trip, in fact, is the best use of computers for traveling that I've found so far. Even when I'm not taking along a computer (which is most of the time), I use one of my machines to help assemble a list of what I want to pack for the journey. The trick is to print out the list, save the disk, and make any additions or corrections each time, based on how the last trip worked out. I now have lists for day hiking trips, car trips to the country, overnight trips, trips to relatives, and so on.

For the fanciest results, you can make your packing lists with a database, either a stand-alone product or one that's part of an integrated package. AppleWorks will do fine, as will most Macintosh integrated products. If you're a longtime *A+* reader, you may remember that using dBASE II for packing lists was one of the examples that Bob Cowart used in his "How to dBASE II" series, starting in the February 1984 issue.

When I use a database, I use one field for the name of the item, one for where to pack it, one for how far ahead it has to be purchased or packed, and one for which person is responsible for getting it ready if I'm not going by myself. I also set up a field for the quantity of items I want to take more than one of and a field for what kind of trips this listing applies to. I suppose I could also add the weight or cost if I thought I'd be close to the limit on either.

Once I've decided on a journey, I take my closest previous list; add and delete items based on what worked out the last time; add any special items; and then print out the list, sorted on each field—that method gives me several lists, but since the computer does most of the work, it's not much trouble to make the whole set. Each list seems to have its own value.

I use the time-sorted list to make sure I get tickets, check the fan belt, turn on the answering machine, tell the neighbors, and water the plants. It's particularly helpful for avoiding that feeling that I must have forgotten something obvious during the last few hours of preparation. Some items have meaning only as part of a last-minute activity checklist—after all, you don't pack watering the plants—but having everything on each list has been easier for me so far than modifying the reports to list only selected items.

The list by item is best for answering questions such as "Did you remember the film?" or "Is anyone bringing pepper?" I tend to use this list more as an index to the others than for actual packing or planning, but it's easy enough to run it off as well. Once I've done most of my packing, though, that list usually gets thrown away.

The list by packing location is the one that I try to take along with me. Even on a day hike, where everything goes into one pack, it still is a help to know exactly what went into the first-aid kit or which pocket contains the bottle opener.

Making packing lists before taking even a one-day trip is the best use of computers for traveling that I've found so far.

If making a database sounds like too much trouble, especially for small day trips with adults only, you can get most of the same benefits by typing your lists with a word processor. Again, the ability to build on your cumulative experience is the key. If you update your list each time, based on experience, you find after the first or second trip that it takes far less time to go through that process than to make a list by hand, and the packing certainly becomes less a source of anxiety.

Don't Forget to Write

The other travel database that I keep on my computer is a list of potential postcard recipients and their addresses. The actual writing of postcards doesn't take very long—it's getting organized that's the hassle. I find that if I'm not careful, I come back from a trip with half a dozen postcards that I've written but haven't been able to address or mail. Having the addresses all ready and organized cuts down on that tendency.

Note that I take only the addresses with me. Personally, I'd consider it a gross abuse to use a form letter and mail-merge program to write computer postcards instead of individual messages. The only further step in postcard automation that I might go for would be to print out the names and addresses I'd need on sticky labels, as a further inducement to get the cards completed and sent out.

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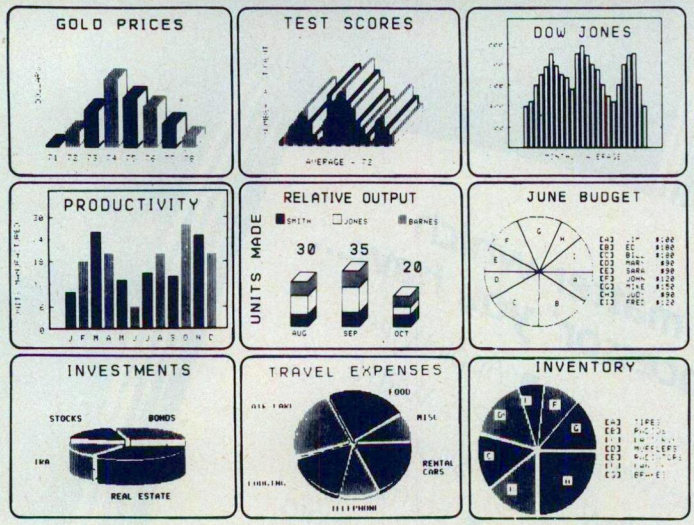
CIRCLE 173 ON READER SERVICE CARD

MasterChart!



Don't pay more for less! The pictures shown above are examples of charts created with MasterChart!, perhaps the most powerful and friendly Apple II chart program on the market. Within seconds, keyboard-entered data can be converted into picture-perfect pie or bar charts, in 26 user-selectable styles, automatically scaled and labelled, and in color or black and white. And if you want to customize your charts by adding extra artwork or text, or display them in a slide show, MasterChart! comes with these valuable extras.....

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A **graphics editor,** for alteration and embellishment of charts. Besides standard point-by-point sketching, built-in structures permit push-button creation of cirlces, rectangles, lines, shape-table shapes, and exotic woven plaid patterns. If you wish to add clarifying text to the charts, you may type on the screen in several different letter font styles. For the artist, the graphics editor can also be used to sketch any imaginable scene from scratch.

A **shape table editor,** for creating special shapes for your charts. These shapes can also be used for animation in your programs! A sample animation program shows how to do it.

MasterChart! includes a screen-dump program for printing your charts on paper. MasterChart! is more! Just read what these people have to say about it...

"I noticed the advertisements for Spectral Graphics' Master Chart! program and figured that, with a money-back guarantee, I would try it. Boy, am I glad I did! This is a fantastic program. You can master its many varied capabilities in less time that it would take to describe them. I would recommend it to everyone, even if you have absolutely no need for a graphing program. It's just fun to play with." **S.A. Smith, San Bernadino, Calif... letter to SOFTALK, June, 1984, page 14.**

"The software does much more than the advertisement suggests. Without question, this is among the best buys in software that I have ever come across, and certainly among the best written. It is extraordinarily easy to use, very well thought out, and priced to kill your competition (which I wish you every success in doing)." **Anthony J. Scriffignano, North Caldwell, New Jersey.**

"I have long been distressed by the lack of software available in the scientificlacademic community. At last there is a simple yet robust graphics program applicable for our purposes: MasterChart!, by Spectral Graphics Software. Business folks and scientists alike will really appreciate how user-friendly it is; I was able to produce my first three-dimensional, multi-colored, labeled bar graph within five minutes of booting the disk--without reading my documentation. I would have had to pay a scientific illustrator much more than the whole program costs just to produce that one graph....you can't do without this gem." **John B. Iverson, Richmond, Indiana...letter to SOFTALK, April, 1984, page 23.**

ONLY $29.95 Apple II+/IIe/IIc. Satisfaction guarantee or your money back (really!). Send a check or purchase order to **SPECTRAL GRAPHICS SOFTWARE,** 6333 Pacific Avenue, Suite 256, Stockton, California 95207. Or call (209) 463-7309 for COD orders and dealer inquires. MasterChart! is not yet sold in most stores. All orders are shipped immediately and are in your hands within three days.

CIRCLE 109 ON READER SERVICE CARD

Of course, you don't have to go away to write postcards. I've been thinking of making some of my own backyard messages this summer for a bit of that down-home touch. I thought I'd try taking a photograph or two; capturing the results with Thunderscan for the Macintosh; and then adding the rest of the borders, captions, and so forth with MacPaint. You can do the same on the IIe or IIc, using a program such as The Print Shop for output.

If you get serious about postcards, you can buy "bristol" stock paper in continuous forms with perforations to snap out postcard-size sheets. Normal paper won't make it through mail-sorting machines, and if you start with a postcard-size piece of stiff paper, you'll have trouble feeding it through an Imagewriter or similar printer. Before I found the continuous forms, I used to print my postcards on full-size sheets of bristol and then cut them to size along lines I included in the design to mark the edges.

Live and Learn

Among book readers, summertime is traditionally the time to read something new, out of the ordinary, or off in a different direction. That's not a bad idea for computerized education either. If you're using your Apple for help with academic studies, your summertime break might be the moment to explore some new possibilities.

If you're using your Apple for help with academic studies, your summer break might be the moment to explore some new possibilities.

As during the rest of the year, instructional software varies widely in quality, and an approach that works for your neighbor might not be the best for you. Generally, programs that ask you for more input than "yes," "no," or a choice from a menu are best—especially on a warm summer evening, a program has to invite your full participation to hold your interest.

If serious education sounds too formidable, you might want to try some interactive fiction as the computer equivalent of the book world's light summer fare. In computerized fiction, your choices become one of the factors that determine how the story unfolds. So far, most interactive fiction seems to be genre stories, such as detective novels, science fiction, or period adventures, but you'll find a wide and growing range of topics and authors.

Of course, there's no rule that says you can't play normal computer games during the summer, and, if you have kids, some of the better games may keep them amused for hours on end. Just as any other kind of addiction or imbalanced diet takes a toll in the long run, however, too much time spent hunched over a joystick isn't good for either children or adults.

Fortunately, computers are still a long way from possessing any feelings of jealousy. You can take a few weeks off from your Apple without any recriminations or bad feelings. A personal computer can be useful, fascinating, and entertaining, but there's more to life than what shows up on the screen. You'll like your Apple even more if you give yourself a chance to miss it now and then. ✚

Steve Rosenthal still has a 40-foot keyboard extension cable he made up a few summers ago. He tries not to let his computers keep him on too short a leash.

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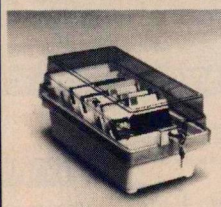

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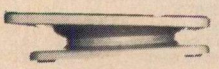

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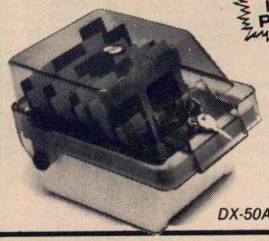

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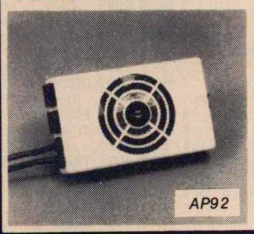

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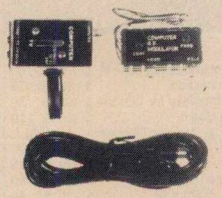

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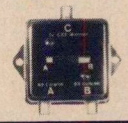

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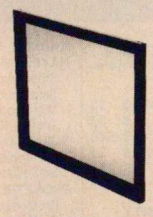

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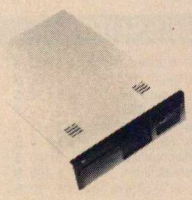

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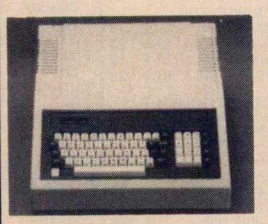

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DOT-MATRIX

▶ **APPLEWORDS**
BY STEVE ROSENTHAL

A short glossary of terms for use with 'Dot-Matrix Printers,' page 26–36

BIDIRECTIONAL PRINTING
The practice of printing lines from right to left as well as the normal left to right. This procedure speeds printing, but it provides less precise registration than if all lines are printed unidirectionally. The Apple Imagewriter normally prints bidirectionally, unless you instruct it to print in one direction only.

BUFFER
A region of memory that stores characters and other codes until the printer is ready to process them. Most printers have a built-in buffer of 80 to several thousand characters, and you can buy external printer buffers with even larger capacities.

CHARACTER PITCH
Although, strictly speaking, it designates the distance between successive characters, the term is usually taken as the number of characters in an inch. Typically, personal-computer printers run at approximately 5, 10, and 15 characters per inch, with other values available in compressed, expanded, or double-width modes. For printing proportional typestyles, where letters occupy varying spaces, an average pitch may be cited or the dot pitch or minimum size increment may be specified instead.

CONTROL CODE
A character or sequence of characters that activates a printer function or sets a mode, rather than printing out on the page. Generally, printers use a combination of control characters (the 32 nonprinting characters included in the ASCII character code) and multicharacter "escape sequences" made up of groups starting with the character produced by CHR$(27). Control codes are not standardized, which is why software needs a special printer driver to produce the codes needed by each different printer.

cpi
An abbreviation for *characters per inch*. Ten characters per inch is normal for computer printers, a spacing also known as pica size. The Macintosh uses proportionally spaced rather than fixed-size characters, so the average cpi depends on the typeface, point size, and even the content of the text. See *character pitch* for more details.

cps
An appreviation for *characters per second*, a figure that frequently characterizes the operating speed of printers. Daisy-wheel printers run at about 10 cps, dot-matrix printers from 40 to several hundred. A page printer such as the LaserWriter takes the same time to produce a page, no matter how many characters are used, giving it a print speed of up to several hundred cps. Most published cps figures are substantially higher than the values actually typical in field use.

DIP SWITCHES
Small switches on printers and interfaces for setting operating modes or default conditions. DIP stands for dual in-line package, which refers to the size and arrangement of the switch connections.

DOT-MATRIX PRINTER
A printer that forms each character out of a pattern of small dots arranged in a grid array. The Imagewriter is an impact dot-matrix model, the Scribe a thermal transfer, and the LaserWriter a laser electrographic unit. The only common non-dot-matrix printing technology is the daisy-wheel.

DOUBLE-STRIKE
A printing mode that makes each character darker by printing it twice. On some printers, particularly dot-matrix models, the second impression is placed a single dot position below the first, a procedure that requires two passes of the printhead.

DOWNLOAD
To send a printer a set of tables telling it how to construct specified characters. This procedure allows the printer to show special symbols, other alphabets, or character graphics. The Imagewriter can store up to 175 such custom characters, the LaserWriter several thousand.

DPI
An abbreviation for *dots per inch*, a measure of how closely a printer can pack the dots it uses to produce characters. The Apple Imagewriter, for example, runs at up to 160 DPI, the LaserWriter at 300 DPI.

EPSON-COMPATIBLE
Said of a printer that imitates the response of the Epson MX/RX series to printing characters, graphics, control characters, and escape sequences. Epson printers are the best-selling personal-computer line, so they're often one of the possible settings on programs and interface cards that work with non-Apple printers.

FONT
A set of characters of a given style and usually a stated size. In some contexts, the italicized or bold version of the letters may be included, as may different scalings of the letters; in others only a single size and variation is included. Both the Imagewriter and the LaserWriter can accept new font definitions, allowing them to print in as many fonts as the software can provide.

HEX DUMP
A listing of all the characters sent to a printer in hexadecimal (base 16) form. Some printers offer it as an option to help debug control sequences.

IMAGEWRITER-COMPATIBLE
Denotes a printer that accepts the same control and character codes as the Apple Imagewriter, producing the same printed result. A few Imagewriter-compatible models are available, and you can make other printers do the job with a software-driver program to do the needed translation.

IMPACT PRINTER
An output device that prints characters by striking dots or character images against a ribbon, pushing ink onto the

paper. The most common in the Apple computer world are impact dot-matrix printers (such as the Imagewriter) and daisy-wheel models (often called letter-quality printers).

INTERNATIONAL CHARACTER SET

A collection of letter forms used in various languages, particularly currency symbols and members of the Roman alphabet with the accents needed for printing various European languages. On the Imagewriter, these are part of the Extended Character Set, which you can select instead of ten normal symbols with either the DIP switches or control sequences. Other printers, including the LaserWriter, include these characters in addition to the normal symbols.

NLQ

An abbreviation for *near letter quality*, the way many printer manufacturers describe the output of their high-resolution dot-matrix printers. Generally, you can see that these characters are made up of dots if you look closely, but the dots overlap to form solid characters, rather than the characters with highly visible dots that are typical in the "draft" or normal dot-matrix mode.

PARALLEL

Referring to connections between an Apple and printers: sending data as groups of eight bits at a time, with each bit carried by an individual wire in a larger cable. The Apple II, II Plus, and IIe can use parallel interfaces, allowing them to use relatively expensive printers and interface cards. The rest of the Apple family requires a serial interface for printer connections.

PRINTER DRIVER

A software package that translates output intended for a printer into the exact form needed by a particular model. Some software allows you to select from various built-in printer drivers, and for others you must install the printer driver as a preboot, memory-resident program or desktop icon.

SERIAL

Referring to connections between an Apple and printers: sending data as successive bits down a single wire, usually in groups of seven to ten bits per character. The Apple IIc, Macintosh, Imagewriter, and LaserWriter all use this type of interface, as can other members of the Apple II family. Sometimes this style is known as an RS-232 interface, referring to an industry standard for this type of connection.

SUBSCRIPT AND SUPERSCRIPT

Literally, characters printed respectively below or above the normal writing line. Some printers have a special subscript mode that rolls the paper a half line up or down for the formation of these characters, but most Apple-compatible printers rely on the software to produce the right effect for subscripts or superscripts by issuing paper-movement commands with fractional-line values.

THERMAL-TRANSFER PRINTING

A printing technology that forms an image by melting wax-based ink from a ribbon or transfer sheet onto the paper. The heat comes from small, resistive dots on a dot-matrix printhead, but since the printhead has no moving parts, thermal-transfer printers are quiet and relatively inexpensive.

UNIDIRECTIONAL

Printing in which the printhead moves in only one direction across the page. Laser printers and older impact printers use this method, but most other printers now print bidirectionally. On some models, unidirectional printing is still used for graphics to produce good dot alignment. +

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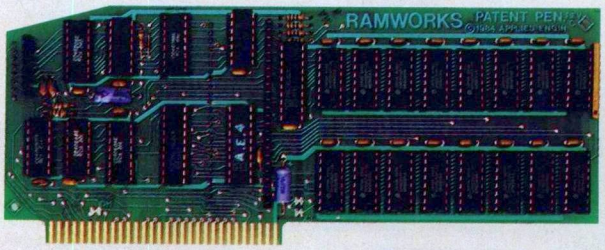

(in the hundreds), Rupert Lissner, and Steve Wozniak (we didn't give one to Mr. Wozniak just to use his name, 2 one meg Ramworks were paid for at full price).

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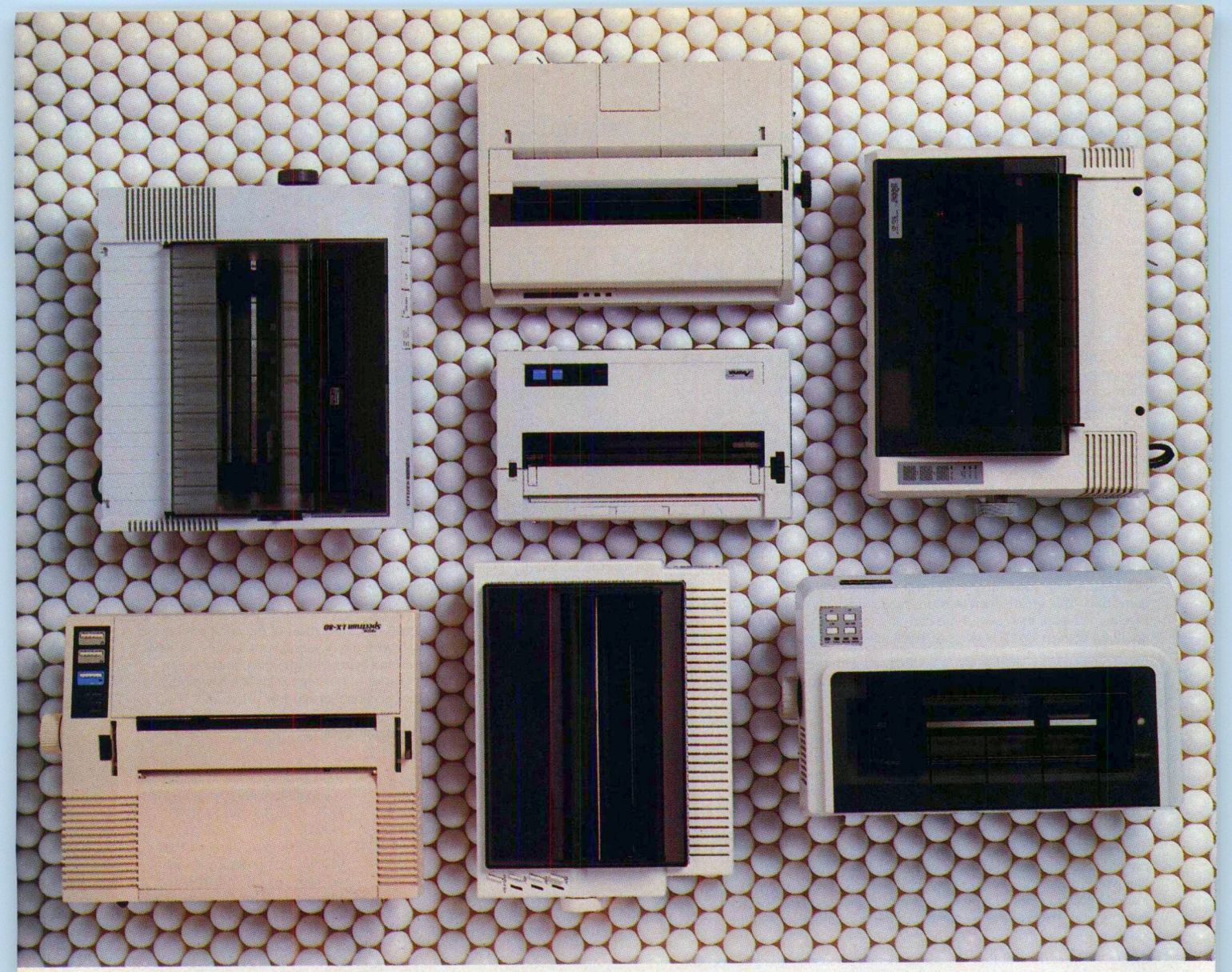


DOT-MATRIX

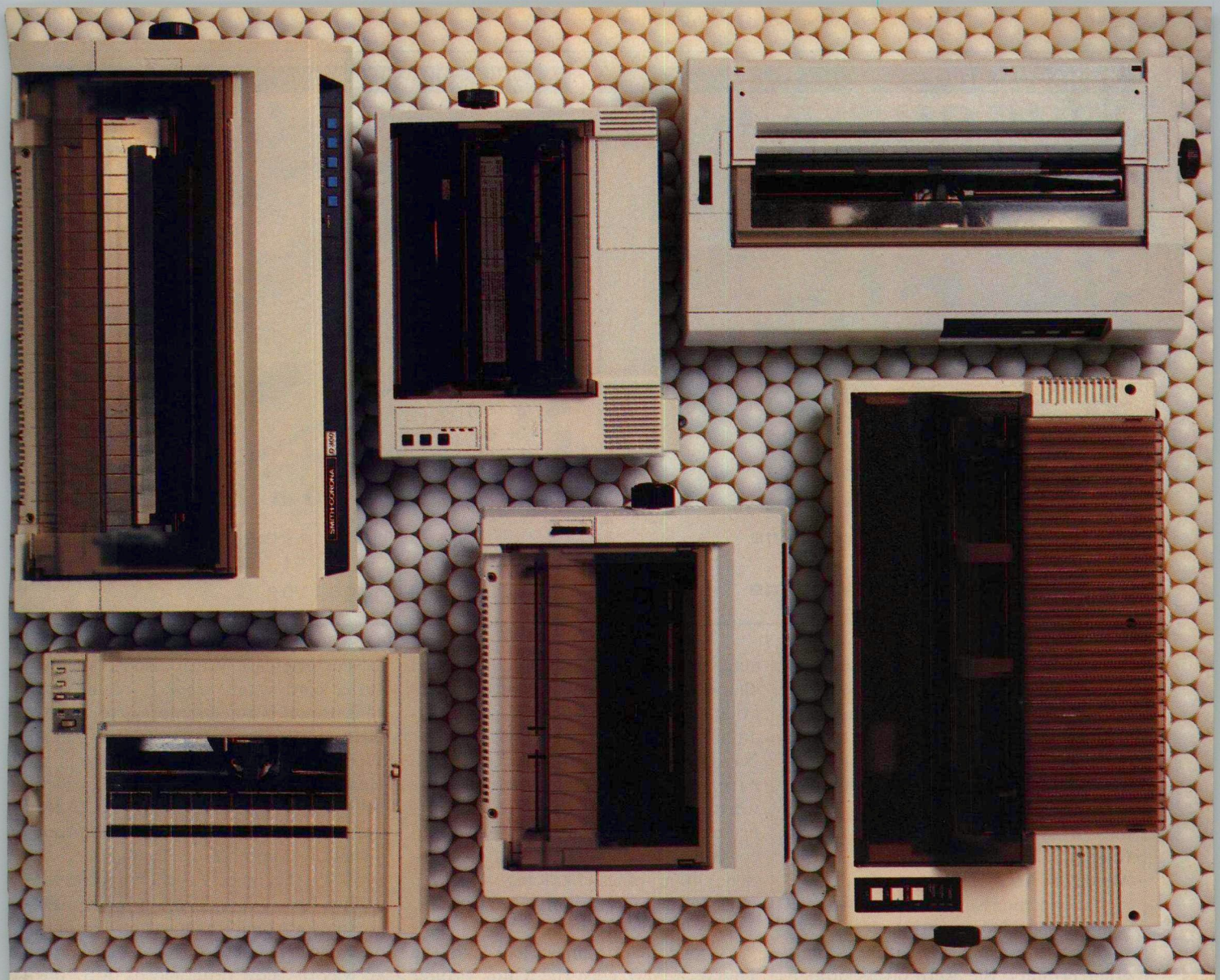
The computer printer is rapidly displacing the typewriter as the primary instrument for producing written communication. In 1984, computer printers printed an estimated 2.5 trillion pages, and this figure is expected to more than double by 1987. This article provides an overview of 15 popular dot-matrix printers. Although more than 200 different models of dot-matrix printers work with Apple computers, the printers we describe here will give you a pretty good idea of what dot-matrix printers can do.

If you can afford only one all-purpose printer for your Apple, it's a sure bet that you're in the market for a dot-matrix printer. Computer users purchase more dot-matrix printers than any other type of printer. Their popularity stems from their low cost (starting at under $300), their speed, and their flexibilty in printing both graphics and text. Some models print only in black, and others print in color with a multicolored ribbon. This article will review a small sample of available dot-matrix printers—14 impact printers and 1 thermal-transfer printer.

What Makes the Dots?

Dot-matrix printers create characters and graphics by producing a series of dots laid out on a grid pattern. These dots are produced by one of three printing methods: impact, thermal, or ink-jet. "Meet the Ink-Jets" in the July 1985 issue of *A+* (pages 48–59) contained an explanation of ink-jet technology and a review of several printers. See this month's "Applewords" column for some common dot-matrix terminology and further details on impact and thermal printing.

Impact printers are the noisiest of the dot-matrix printers because metal pins actually strike the ribbon, forcing it onto the paper. In contrast, thermal printheads do not strike the ribbon or paper. Therefore, thermal printers tend to be quieter than impact printers. Although thermal dot-matrix printers



▶ HARDWARE/BY DAVID TOWNSLEY AND FRANCESCA VENNING-TOWNSLEY

PRINTERS

We survey 15 popular models of dot-matrix printers—fast, flexible, and economical solutions to your printing needs.

can print on any paper, paper with a smooth finish is recommended for best results.

Features

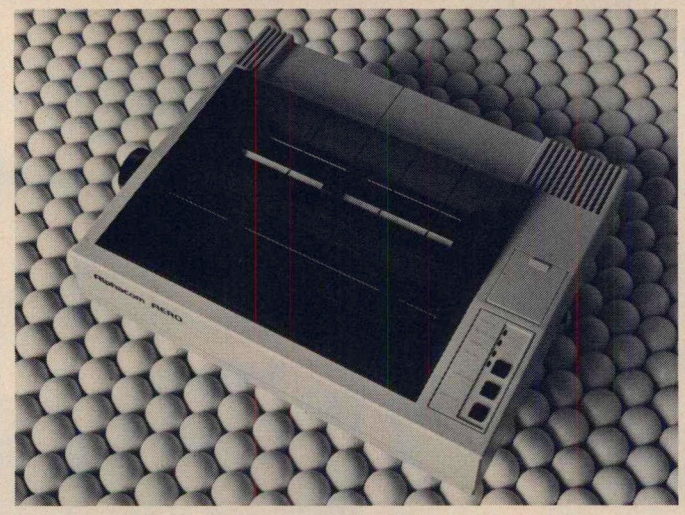
Many dot-matrix printers advertise their ability to print near-letter-quality (NLQ) or correspondence-quality text. This type of print quality is achieved by an increase in the density of dots that form each letter, which makes each letter dark and fully formed. Not all printers offer NLQ print. Almost all do offer easy-to-use control codes to underline text, emphasize print, do superscripts and subscripts, and alternate various print pitches such as pica (10 cpi [characters per inch]), elite (12 cpi), condensed (15–17 cpi), and expanded (5–8.5 cpi). In fact, these features are so common among the printers we looked at that, in the following reviews, we'll refer to them as "the basic features."

A simple way to judge print quality is to compare the number of printed dots per character, both horizontally and vertically. Draft text printed with a 9×9 matrix of dots per character looks sharper than the same text printed with a 7×8 matrix. Because its number of dots per character is roughly double that of draft print, NLQ text looks much sharper.

When you consider print speed,

DOW/CLEMENT PHOTOGRAPHY

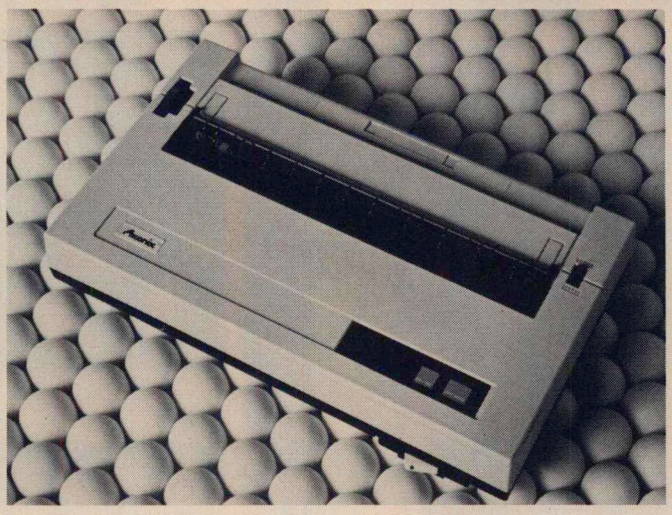
ALPHACOM AERO



Normal A+ Magazine

Emphasized A+ Magazine

AXONIX THINWRITE 80



Draft A+ Magazine

NLQ A+ Magazine

don't rely too heavily on a manufacturer's specs because these print speeds do not account for the additional functions of the printer, such as carriage returns or the use of fancy features. We ran our own test—as we printed this article—to arrive at more realistic print speeds measured in characters per second (cps).

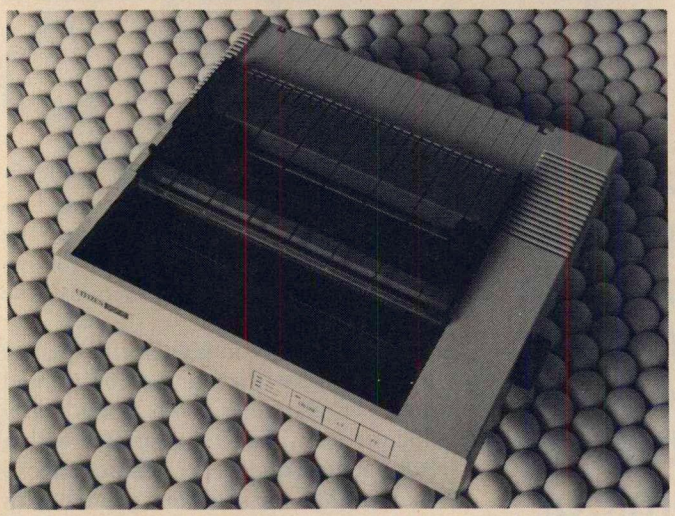
Alphacom Aero

For an unassuming but compact printer, consider the Alphacom Aero. In addition to the basic features seen in other printers, the Aero offers proportional spacing in the Emphasized Character mode and the ability to download characters of your own choice or creation. Unfortunately, this printer is among the loudest tested, does not offer NLQ print, and isn't the easiest to feed paper into. The manual also is not the warm-and-friendly type. Still, the printer brisks along at a reasonable 76 cps in the Draft mode, offers an additional 40 graphics characters, and even sports a mode that dumps hex code.

Axonix ThinWrite 80

Among the printers we looked at, the ThinWrite 80 gets the Cute Printer award. Not only is it small enough to fit in your briefcase, but it also runs without a cord when properly recharged. This printer is quietly impressive. In addition to the basic features, the ThinWrite 80 has 48 graphics characters, a Hex-Code Dump mode, and a nice NLQ print that uses an 18 × 23-dot matrix per character. For Macintosh owners, Axonix offers a module, at $159.95, that makes the ThinWrite 80 or any Epson-compatible printer operate like an Apple Imagewriter. The only drawback we found with the ThinWrite 80 was the slow print speeds of 33 cps for the Draft mode and 11 cps for

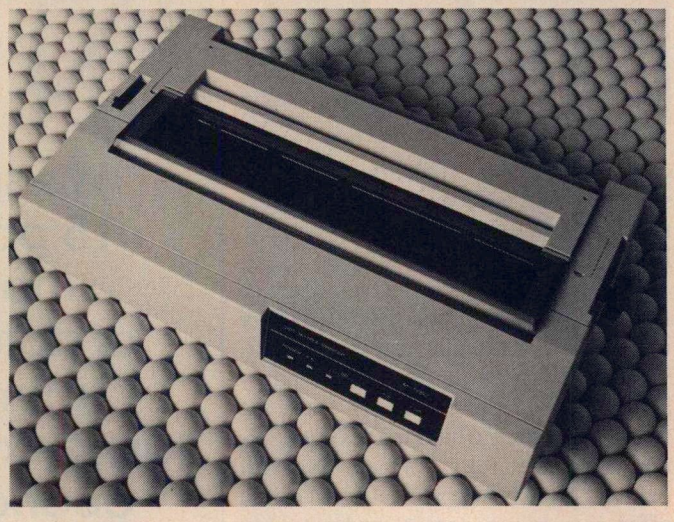
CITIZEN MSP-10



Draft A+ Magazine

NLQ A+ Magazine

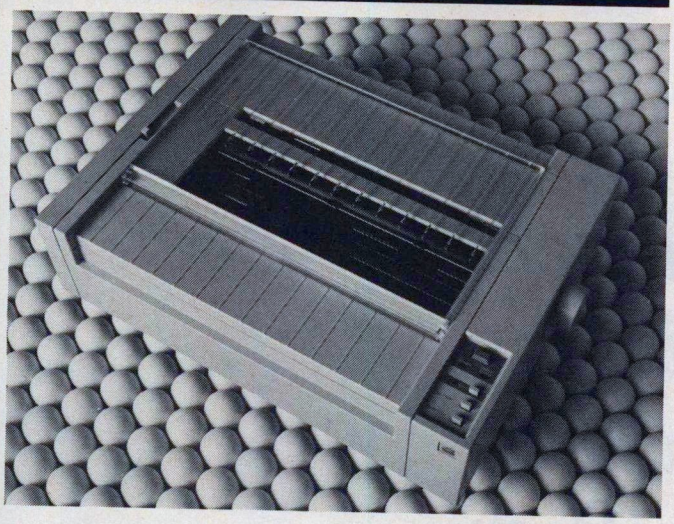
C. ITOH M-1550S



Normal A+ Magazine

Bold A+ Magazine

APPLE IMAGEWRITER



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Standard  A+ Magazine

Boldface  A+ Magazine
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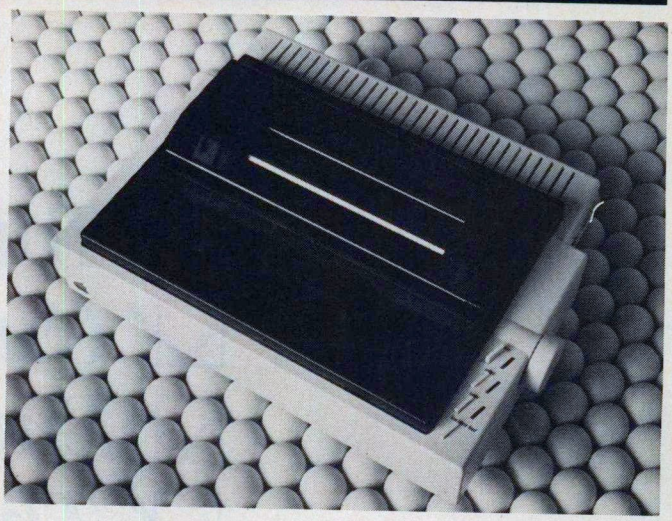
APPLE SCRIBE



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Draft Mode    A+ Magazine

Letter Mode   A+ Magazine
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NLQ. This inconvenience may very well be a small trade-off for the nice print quality this truly quiet and portable printer produces.

Apple Imagewriter

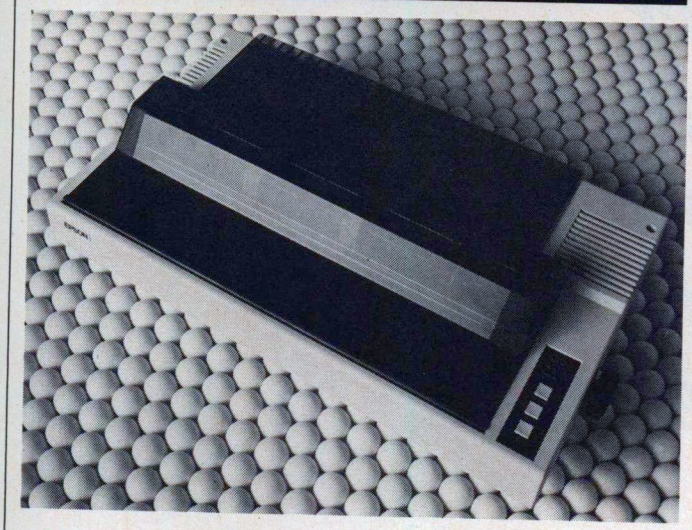
The Imagewriter is Apple Computer's premier dot-matrix printer. Along with the basic features, the Imagewriter has a Headline mode for printing expanded characters in combination with any of the other six character pitches. Proportional spacing is usable with both pica and elite typestyles, and underlining and emphasis can be added to all six print pitches. The normal character matrix of 7 × 8 dots, which is not quite as dense as that of other printers, prints out at a mediocre 62 cps. Alas, the Imagewriter has no NLQ print. It does support the special features of the Macintosh, however. It also possesses memory for downloading 175 characters.

By using the Imagewriter Tool Kit disk that comes with the printer, for example, you can transfer special typefaces and typestyles to the Imagewriter, which will allow you to print superscripts and subscripts or even design your own NLQ or graphics characters.

Apple Scribe

The Apple Scribe is an attractive thermal-transfer printer designed for the home market. It can print in black or in color by using a three-band color ribbon. The color ribbon comes with three primary colors (yellow, cyan, and magenta) and can combine to produce six colors plus black. Printing in color requires that the software you use is specifically suited for Scribe color printing. At this writing, about seven of these programs are available—Dazzle Draw from Brøderbund, The Write Choice, from Roger Wagner Publica-

EPSON FX-100+



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Draft  A+ Magazine

Emphasized A+ Magazine
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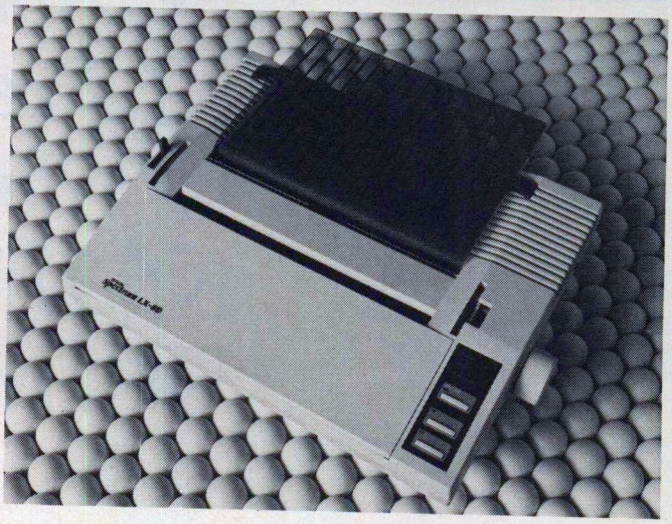
EPSON SPECTRUM LX-80



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Draft  A+ Magazine

NLQ    A+ Magazine
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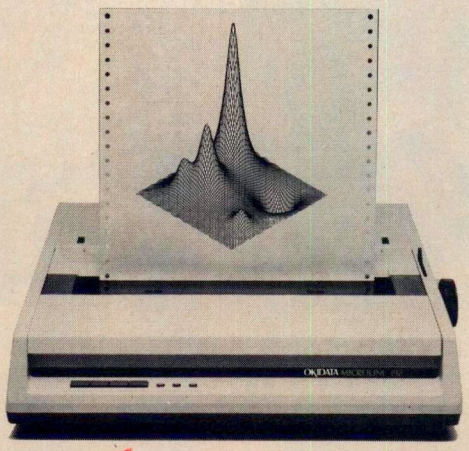
- [x] *Tougher*
- [x] *Quieter*
- [x] *Smarter*
- [x] *Thriftier*
- [x] *Easier*
- [x] *Quicker*
- [x] *Finer*
- [x] *Cleaner*
- [x] *Sharper*
- [x] *Sturdier*
- [x] *Abler*
- [x] *Prettier*
- [x] *Slimmer*
- [x] *Trimmer*
- [x] *Friendlier*



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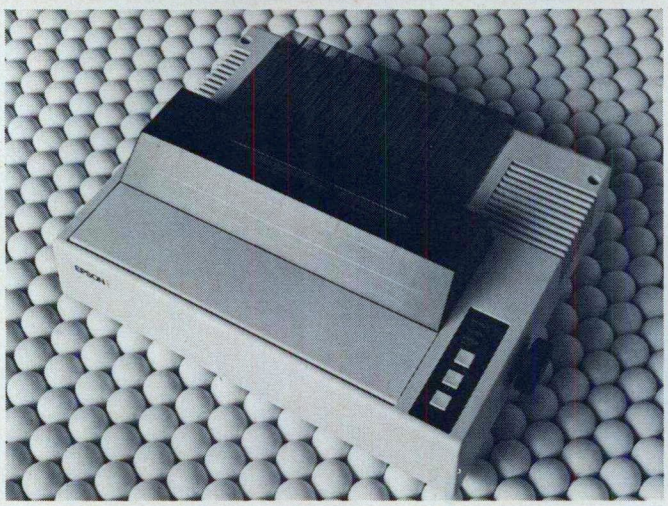

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Default      A+ Magazine

Emphasized   A+ Magazine
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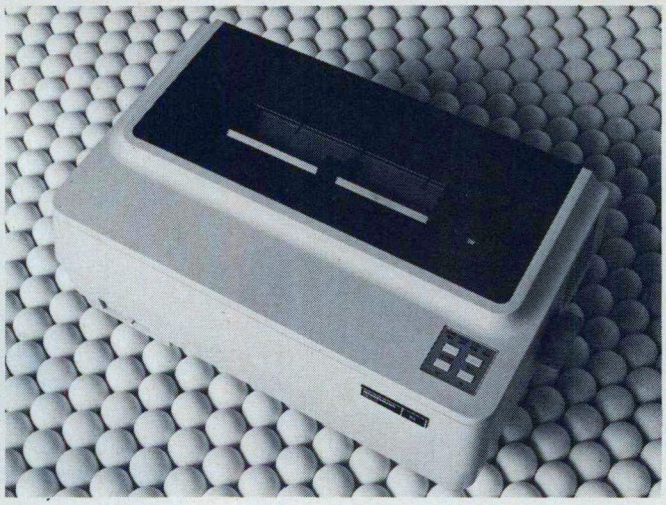
MANNESMANN TALLY MT85



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Draft   A+ Magazine

NLQ     A+ Magazine
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tions; and KoalaPainter from Koala Technologies are three examples. Because the Scribe is a thermal-transfer printer, you will want to use smooth paper to get the best print quality. The Scribe comes with just three print styles: draft (the default), condensed, and NLQ. As with the Imagewriter, we found it a bit difficult to feed paper into the Scribe, and we also discovered that the printer wouldn't operate with the cover off. The biggest drawback of the Scribe printer may be its slow printing speed of only 33 cps in the Draft mode and 26 cps in the NLQ mode.

Citizen MSP-10

The Citizen MSP-10 is a new printer from Citizen America, a subsidiary of the well-known watch manufacturer. The Citizen printer we looked at has a clean, crisp print quality, especially in the NLQ mode. You can invoke the NLQ mode either through software commands or simply by pressing the line-feed and on-line buttons simultaneously.

The Citizen offers all the basic features and prints at a speed of 68 cps in the Draft mode and 23 cps in the NLQ mode. The documentation that we saw was not in final form, but a note explained that the company would send a new version of it upon receipt of the registration card enclosed with the printer.

C. Itoh ProWriter M-1550/S

The C. Itoh ProWriter 1550/S is a wide (15.5 inches) printer that zips along at 90 cps and even offers an italic typestyle, beyond the basic features. The lack of an NLQ character set may be this printer's biggest drawback. The paper-out beeper, which sounds like a smoke-detector alarm, might also have been a drawback, except that you can

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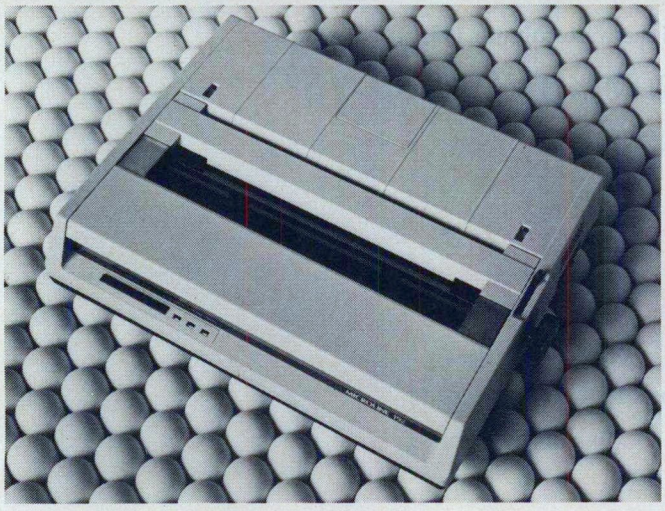

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Draft   A+ Magazine

NLQ     A+ Magazine
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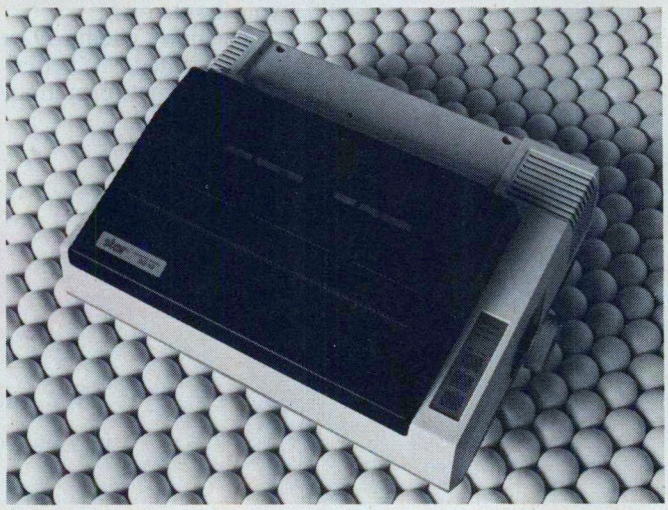
STAR MICRONICS, INC. SG-10



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Draft   A+ Magazine

NLQ     A+ Magazine
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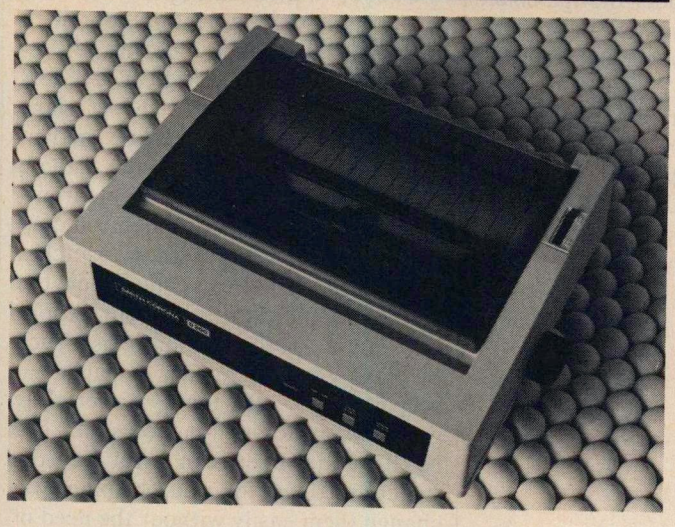
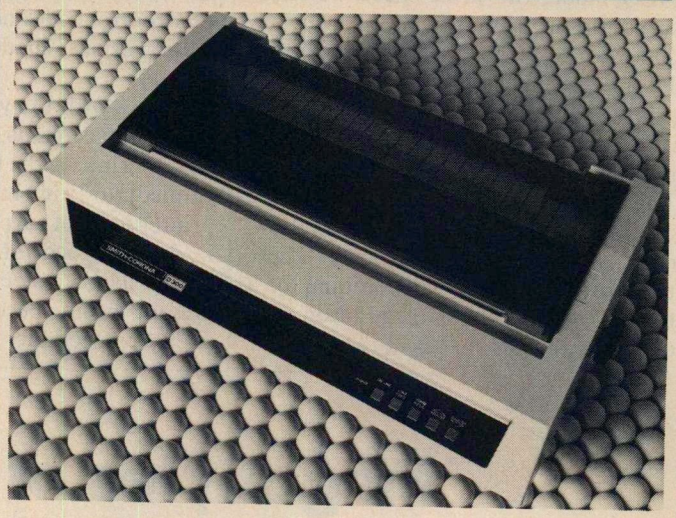
SMITH-CORONA D-200



Normal A+ Magazine

NLQ A+ Magazine

SMITH-CORONA D-300



Normal A+ Magazine

NLQ A+ Magazine

turn it off permanently if you like. There is, however, a 95-character download capability and 64 graphics characters to try out. Don't expect this printer to be quiet (it's fairly loud) or expect an easy-to-understand manual—it obviously was translated from Japanese.

Epson FX-100+, LX-80, and JX-80

Epson, a well-recognized name in printers, has several impact printers on the market. The three we review in this article have the basic features in addition to an italic typestyle and a Hex-Dump mode for programmers.

Unfortunately for Macintosh and Apple IIc owners, these Epson printers are available only with a parallel interface. You will need a serial-to-parallel converter to use these printers with a IIc or Mac. For owners of Apple II, II Plus, or IIe computers, Epson sells an Apple II Parallel Interface Kit for $85.

On the positive side, the Epson printers include such distinctive features as SelecType and Master Select. The SelecType feature lets you choose typestyles (e.g., pica or elite) by using the three function buttons on the top of the printer. This feature is an easy-to-use departure from having to use control codes to change print modes. Speaking of control codes, the Master Select feature lets you enter any combination of eight different print enhancements or pitches by using a single ESC code sequence—a nice timesaver. Coupled with the Epson printers are clear, well-written manuals that make setting up and using these printers a breeze.

FX-100+. The FX-100+ is a longer-carriage version (holding paper up to 16 inches wide) of the popular FX-80+. One difference between them, however, is that the FX-80+ can print in the Immediate-Print mode (like a typewriter), but the FX-100+ cannot. A standard font (Roman, pica) comes with the FX-100+, but, with SelecType, you can choose combinations of ten typestyles including italic. The variety of print enhancements and pitch combinations is rather amazing, and the speed is a brisk 93 cps. The only enhancement that is lacking is an NLQ print, but Epson has an optional board that will fix that and provide an additional 6K buffer.

Spectrum LX-80. A sleek new Epson printer is the LX-80. In addition to possessing the features found in other Epson printers, the LX-80 was the only Epson we tested that had both a Draft and NLQ print mode. In the Draft mode, it prints letters in any one of four available print sizes and eight print enhancements. The SelecType on the LX-80 features about half as many choices as on the FX-100+, but it includes NLQ print. Not surprisingly, when we

CONNECTING APPLES TO PRINTERS

Apples use two main methods for communicating with printers, a serial connection or a parallel connection. Parallel printers usually come equipped with a Centronics-type parallel communications port and serial printers are usually equipped with an RS-232 serial communications port. You'll need to make sure you have the right interface and cable before you can hook your printer up to your computer. Here's a brief run-down on what you'll need to connect your Apple to a printer.

Computer	Serial Printers	Parallel Printers
Apple II, II Plus, IIe	RS-232 serial interface card and cable	Centronics-type parallel interface card and cable
Apple IIc	IIc serial cable	Serial-to-parallel converter and IIc cable
Apple III	RS-232 serial cable	Serial-to-parallel converter and cable
Macintosh	Mac serial cable	Serial-to-parallel converter and cable
Lisa (Mac XL)	RS-232 serial cable	Serial-to-parallel converter and cable

switched from the Draft mode to the NLQ mode, the print speed we measured dropped significantly, from 68 cps down to 15 cps.

JX-80. The JX-80 is a color impact printer, similar to the FX-80+. In fact, it offers all ten of the SelecType functions of the FX-80+ and FX-100+. The easy-to-install ribbon cartridge contains three primary colors (yellow, cyan, and magenta) plus black. These three primary colors can combine for a total of seven colors. In addition, you can print various shades of these colors, such as adding magenta to orange to produce a deeper, redder orange color. The control codes necessary to produce these various shades are straightforward.

Along with the various print pitches and enhancements available on other Epson printers, the Epson JX-80 has an Immediate-Print mode that allows the printer to print text as you type it on the keyboard (good for typing single envelopes). For a color printer, the 83-cps default print speed we observed was pretty respectable.

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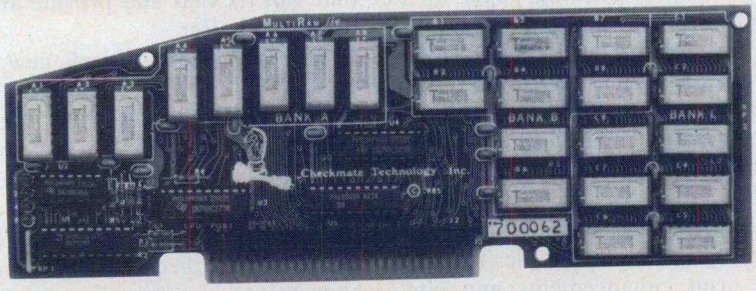

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Mannesmann Tally MT85 and MT86

The attractive casing of the new MT85 and MT86 printers contain a wealth of features not to be missed. Actually, the MT85 and MT86 printers are identical, except for the carriage widths of 8 and 13.5 inches, respectively. One of the unusual features of these two printers is the programmable front-panel DIP switches. Although you may never change most of these switches (such as those that can control how the printer communicates to your Apple, for example), other options exist (such as NLQ vs. Draft mode, or paper-out beeper on vs. off) that you certainly would want to use on occasion. The MT85 and MT86 can print out the switch settings for you, helping you change them easily without the need of a flashlight and screwdriver to get at the DIP switches.

Other features the MT85 and MT86 possess include plug-in font-generator modules at $34.95 each for new character sets. Even without these extras, the printer still has an italic character set, memory for 256 download characters, and the usual variety of print pitches and enhancements. What's more, an NLQ mode can be combined with proportional spacing and any one of four print pitches. We ran our speed test on the MT85 in the Draft mode and saw 99 characters per second fly by, while the NLQ mode sauntered through at 27 cps. Surprisingly, the printer was among the quieter ones we heard. To top it off, the manual was one of the most readable and supportive.

Okidata Microline 192

The Microline 192 is a full-featured printer with several features that make it easier to use. For instance, the Microline 192 does a better-than-average job of detecting the end of the paper, because its paper sensor is on the left side of the platen bar near the level of the printhead, rather than behind the platen bar as is the case with many other printers. In addition, paper feeds in either from the top of the printer, as is the case with most printers, or from beneath, which is especially handy for continuous sheets.

The Microline 192 prints at a speed of 31 cps in the NLQ mode and 90 cps in the Draft mode. Perhaps one of the most helpful features of the Okidata printer is its excellent documentation. The manual is not only comprehensive, but also reasonably easy to understand.

Smith-Corona D-200 and D-300

This familiar typewriter manufacturer offers several dot-matrix printers

worth noting. The D-200 and D-300 are two printers with the same internal mechanism and features but different carriage widths (11 and 14 inches, respectively). In addition to the basic features, they have italics, a Hex-Dump mode, two graphics character sets, and even memory for 96 download characters. The NLQ font should handle your correspondence needs, and it can be combined with elongated or proportional spacing. The skimpy manual might lead one to believe that there is little to be said for this printer, but this is certainly not the case. In fact, the speed of the D-200 and D-300, at 97 cps, was among the best we saw for the Draft mode, although this speed dropped down to about 22 cps for NLQ.

Star Micronics SG-10

For a flexible, multifeature printer with a convenient, easy-to-understand manual, take a look at the Star Micronics SG-10. You can print in the Draft or NLQ modes, or even in italic characters. Not only does the SG-10 have all the basic features, but many combinations of them are also allowed. Surprisingly, the NLQ mode seems to be the one mode that does not mix with proportional spacing. With its full set of graphics characters and some 240 additional characters that you can download, however, this printer is hard to find fault with. This printer's worst feature has got to be the spool-feed (noncartridge) ribbon that adds time, and dirty fingers, to the setup procedure. Its best feature is certainly its easygoing manual. The Star SG-10 manual, unlike most manuals, makes reading about the printer practically entertaining. Besides the ribbon, the only other nuisance we found was the piercing paper-out beeper that made us run for cover. This beeper, fortunately, can be turned off. The print speed we measured was 82 cps for the Draft mode and 20 cps for NLQ.

Which Is Best?

Unless you're confident that you know what you're doing, don't buy a printer until you have someone (such as a dealer) demonstrate that it works with your computer and your software. Remember to determine what other items (interface cards, cables, and so on) you'll need in order to get the printer running. Then you'll be better able to compare prices.

As always, the final choice is a matter of considering your needs and your budget. A graphic artist is likely to be more interested in color-printing capabilities than in NLQ print and fancy

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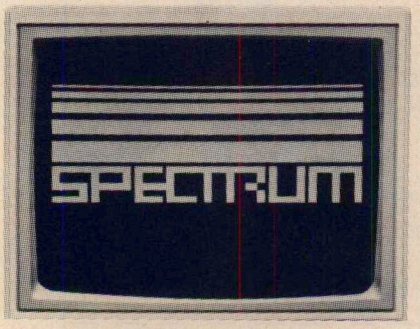

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CIRCLE 179 ON READER SERVICE CARD

text features. A writer will probably consider the text features of paramount importance, but a programmer who's on the go might look for portability, speed, or Hex-Dump modes. For everyone, noise and price are strong considerations, but attention to usable tradeoffs can help you choose the right printer for your particular situation. ✚

We'd like to thank Western Micro Systems of Cupertino, California, and Stanford Computer Basics of Mountain View, California, for providing some of the equipment reviewed in this article.

Francesca Venning-Townsley, a writer/instructional designer, has written about computer products since 1982. David Townsley is a product engineer in the semiconductor industry and a frequent contributor to A+.

▸ PRODUCT INFORMATION

Aero Printer
Alphacom, Inc.
2323 South Bascom Avenue
Campbell, CA 95008
(408) 559-8000
List Price: $249.95
Requires: Apple II, II Plus, IIe, IIc, or III
CIRCLE 396 ON READER SERVICE CARD

Citizen MSP-10
Citizen America Corp.
2425 Colorado Avenue
Santa Monica, CA 90404
(213) 453-0614
List Price: $449
Requires: Apple II Plus, IIe, or IIc
CIRCLE 397 ON READER SERVICE CARD

D-200, D-300
Smith-Corona
3695 Erie Blvd., East
DeWitt, NY 13214
(800) 448-1018
List Price: D-200, $549; D-300, $745
Requires: Apple II, II Plus, IIe, IIc, or III
CIRCLE 398 ON READER SERVICE CARD

FX-100+, Spectrum LX-80, JX-80
Epson America, Inc.
2780 Lomita Blvd.
Torrance, CA 90505
(213) 539-9140
List Price: FX100+, $699; Spectrum LX-80, $299; JX-80, $699
Requires: Apple II, II Plus, IIe, or III
CIRCLE 399 ON READER SERVICE CARD

Imagewriter
Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014
(408) 996-1010
List Price: $595
Requires: Apple II, II Plus, IIe, IIc, III, Macintosh, or Mac XL
CIRCLE 400 ON READER SERVICE CARD

Microline 192
Okidata
532 Fellowship Road
Mt. Laurel, NJ 08054
(609) 235-2600
List Price: $529
Requires: Apple II Plus, IIe, or IIc
CIRCLE 401 ON READER SERVICE CARD

MT85, MT86
Mannesmann Tally
8301 South 180th Street
Kent, WA 98032
(800) 447-4700
List Price: MT85, $499; MT86, $599
Requires: Apple II, II Plus, IIe, IIc, III, Macintosh, or Mac XL
CIRCLE 402 ON READER SERVICE CARD

ProWriter M-1550/S
C. Itoh Digital Products
1011 Francisco Street
Torrance, CA 90502
(213) 327-5939
List Price: $849
Requires: Apple II, II Plus, IIe, IIc, or III
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Cupertino, CA 95014
(408) 996-1010
List Price: $299
Requires: Apple II, II Plus, IIe, or IIc
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SG-10
Star Micronics, Inc.
200 Park Avenue
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New York, NY 10166
(212) 986-6770
List Price: $299
Requires: Apple II, II Plus, IIe, IIc, or III
CIRCLE 405 ON READER SERVICE CARD

ThinWrite 80
Axonix Corporation
417 Wakara Way
Salt Lake City, UT 84108
(801) 582-9271
List Price: $449
Requires: Apple II, II Plus, IIe, IIc, or III
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What every Apple II+ and IIe user should ask before buying the "Sider" 10 MB hard disk:

When a company offers a superior quality 10 megabyte Winchester hard disk for only $695, it's bound to raise a few eyebrows...and a lot of questions. The fact is, you're probably already wondering "Can I really get a 10 megabyte hard disk that's *reliable* for only $695?" The answer is: ABSOLUTELY...when you choose the Sider from First Class Peripherals.

What's so great about the Sider?

For starters, the Sider lets you boot your ***Apple II+*** or ***IIe*** directly off the hard disk—unlike some other Winchester subsystems. Rebooting is also trouble-free. And the disk is partitionable, allowing you to allocate space to four operating systems on the same disk. The Sider supports: Apple DOS 3.3; Pro DOS™; Apple Pascal; and CP/M®

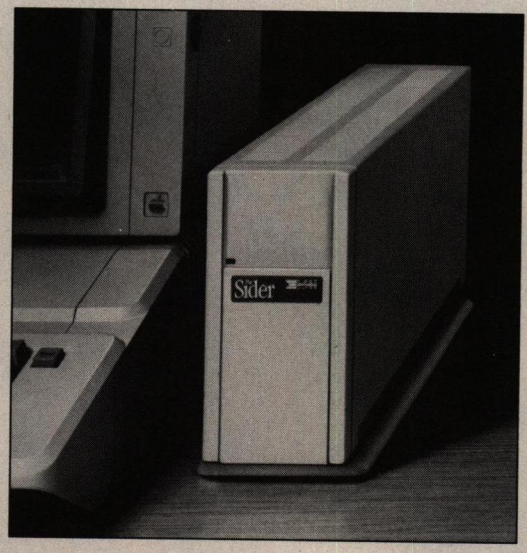
What's more, a small "footprint" lets you incorporate the compact Sider into your existing computer set-up with ease.

In addition, with the Sider, you not only pay far less for the subsystem, you also save money on installation. Because, unlike other 10 MB systems that require the purchase of expensive "extras," the Sider is *plug and play*. Everything you need is provided, including cables, host adaptor, installation software and manual.

What makes it so reliable?

To start, the Sider is manufactured, and sold exclusively, by First Class Peripherals, an innovative computer company which is backed by Xebec. The computer industry's leading manufacturer of disk controllers, Xebec has over a decade of experience serving customers like IBM, Toshiba, Texas Instruments and Hewlett Packard. It's this kind of expertise that helps assure the Sider's performance.

Special design features further enhance reliability. The Sider's controller is the field-proven, industry standard Xebec S1410A. And Xebec's 3200 drive tester, the toughest in the industry, ensures that the Sider will operate reliably. One more assurance of the $695 Sider's quality: it's UL Approved and FCC Class B rated.



"Only $695?"

But why is it only $695?

You pay less for the Sider than for other 10 MB hard disks simply because you're paying for the superior quality components inside the unit, not for a lot of retail overhead costs. Since First Class Peripherals sells direct, you avoid dealer and distribution expenses, and pay only for the product.

What about a guarantee?

Like many experienced Apple users, you may be reluctant to buy a hard disk priced at only $695 without first seeing for yourself how it performs. That's why First Class Peripherals offers you a reassuring, money-back guarantee that eliminates any risk on your part. Simply order the Sider and use it for 15 days. Then, if you're not entirely satisfied, return it and receive a full refund—no questions asked.

The Sider also comes with a full one-year limited warranty. Plus, there's a convenient, toll-free hotline you can call anytime you have a technical or service question, or need help.

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CIRCLE 105 ON READER SERVICE CARD

SUMMER IS HERE, and the mode in *haut tech* is *leisure*. Time to pack away those heavy spreadsheets and forecasting packages; time to put those complex integrated packages on the shelf for while. Summer is the time for fun and fashion.

LEISURE

WARE

SUMMER SOFTWARE FUN FOR APPLE II USERS

The word among the software-fashion-conscious this season is *leisureware*. And when it comes to leisureware, designers seem to have something for just about every Apple II user.

NATIONAL PASTIME

What's synonymous with summer? Baseball, of course, and this summer baseball is as American as Apple II. For the Apple, from Rainbow Computing of Northridge, California, comes Bat-Stat, a baseball-statistics package. If you enjoy keeping track of every movement of your preferred players, this software can keep you company during your favorite summer activity.

SPORTSWARE

People of summer leisure do not live by baseball alone. When it comes to sportsware, several other designers have packages for your consideration.

If you golfers don't want to get out there and tread the links, you can simulate a game on some of the world's top courses with Golf's Best from 1STEP Software, Inc., of Charlotte, North Carolina. This golf-simulation program features color graphics, close-ups, aerial views, and scorecards.

Horse-racing fans: A package from PDS Sports of Torrance, California, is designed for handicapping races and deciding which horses to play. The package is called Thoroughbred Handicapping System I.

Another California designer, Market Computing of Huntington Beach, has a full line of sportsware. This company is big in the leagues. League Registration, League Scheduling, and League Standings are all aimed at maintaining the various activities and needs of sports leagues.

Swim Meet and Tennis Draw keep track, respectively, of swimming and tennis contests.

With the emergence of the USFL, football has become a virtual year-round sport. The Predictor from Pickham Software purports to help you pick winners in football bouts.

As the NFL exhibition season starts, you can start to handicap the games with NFL Football, Gold Edition, from Systems Design Lab of Redondo Beach, California.

Runners and would-be runners are the targets of Software Publishing Corporation (Mountain View, California) with The Running Coach. After you have selected your running ensemble, use this package to develop your own running program (an upcoming issue of *A+* will review The Running Coach and other running programs).

NUMBERSWARE

If your concept of leisure involves numbers, you can enter lotteries. Matrix Software of Big Rapids, Michigan, produces a program, Lucky Day/Lottery Report, with which you can create and maintain reports on the numbers game Lotto. Veteran Lotto players will no doubt find this program useful. Lotto tyros, however, may be taking a gamble, since skimpy documentation provides virtually no information about how to play the game.

WEARWARE

Leisureware isn't restricted to sportsware and numbersware. From Compucrafts of Lincoln, Massachusetts, comes Stitch Grapher, a computer-aided-design package. Computer couturiers can use the package for needlepoint, bargello, latch-hook, and design knitting. By selecting from a group of 30 symbols, you create a design on a grid, making corrections as you progress. You can store your results and print them for later use.

WHERE?WARE

Whether or not we are all descended from Adam and Eve—no strangers to the Apple—we all have roots somewhere. Now you can use your Apple to help you trace your origins. Ancestry Link from Accelerated Logic, Inc., is a genealogical-research program. It is aimed at genealogical professionals and family historians. Since it can catalog and track 1000 ancestors and descendants, it requires four disks: tutorial, program, auxiliary, and data.

WETWARE

Summer is the time for nice cool gin and tonics, mint juleps, and other refreshments. If you're new to the art of mixology or if you've forgotten how to assemble your favorite concoction, the Mr. Boston Official Bartender Guide is

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now in software form, from Concept Development Associates, Inc. This libationary leisureware provides you with more than 100 recipes, which you can catalog, print out, or edit to suit your taste. The next time you have a pool party, haul your Apple out to the patio and set it up on the bar. Just be careful not to spill any of your creations on the keyboard or the three disks: program, liquor drinks, and liqueur drinks. Before you have too many cocktails, make yourself a data disk.

MINDWARE

What makes you tick? Personality Profile from Psychological Psoftware of Del Mar, California, won't give you any real insights, but you might find it entertaining. It's similar to Mind Prober from Human Edge Software; the difference is that Mind Prober allegedly psychs out other people. Like a horoscope, Personality Profile provides all-purpose "insights" into your life—example: "You have great ego strength." You answer some multiple-choice questions, and onto the screen pops an interpretation of your answers.

Also from Psychological Psoftware comes a package with which you can analyze and log your dreams, The Dream Machine.

Biofeedback falls under the category of mindware, and Synapse Software of Richmond, California, has a package called Relax. Are you really relaxed on those lazy summer days? Use your Apple to monitor your circadian rhythms.

TRAVELWARE

Summertime is vacation time—time to get out and see the world. Micro Travel Companion from Concept Development Associates, Inc., of Bethesda, Maryland, is an electronic Baedecker for travelers. If you're planning to take a trip this summer, you can use this package to plan the itinerary and keep a database of reservations, favorite locations, and other travel-related information. (From the same manufacturer: Wine Companion and Kitchen Companion.)

More adventurous travelers may want to fly their own planes to destinations near and far. Pilot Log from DHM Specialty Software of Dallas, Texas, gives pilots the option of keeping their logbook on an Apple.

While your mind is on the skies, you may want to experiment with a package called Computer Assisted Astrology, from Matrix Software.

SAVINGFACEWARE

Facial fashion is the specialty of Mask Parade from Springboard Software, Inc., of Minneapolis, Minnesota. Designed for kids, the package lets them create their own masks, print them out, and wear them. Mask Parade gives little designers the option of assembling masks from stock elements or making their own from scratch with a built-in "crayon." This program is similar in concept and operation to Springboard's The Newsroom, with which you can create rudimentary newsletters (see review in *A+* next month).

Also for creative kids is Many Ways to Say I Love You from CBS Software of Greenwich, Connecticut. They can use the package to create their own electronic greeting cards.

GARDENWARE

With Plantin' Pal from Home & Hobby Software, Inc., of Minneapolis, Minnesota, you can make your garden fashionable, as well as plan your planting. The package can plan a 60 × 36-foot patch. You decide what and how much you want to plant. The program fills the garden grid with symbols for your crops. If you run out of space, you alter quantities or delete certain crops. The program and manual also provide comprehensive data on individual crops, companion crops, garden pests, and other gardening considerations.

POSTALWARE

Stamp collecting, which is heavily dependent on cataloging, seems to be an ideal match for an Apple. Andent, Inc., of Waukegan, Illinois, has made the match with a six-program database for philatelists called Stamp Collector.

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Some of the leisureware in this survey amounts to little more than games, but some of it is useful tools that can also be informative and entertaining.

Have fun. ✚

John Barry, a free-lance writer and editor, is coauthor of The Unofficial I Hate Computers Book. *He is a funware expert par excellence.*

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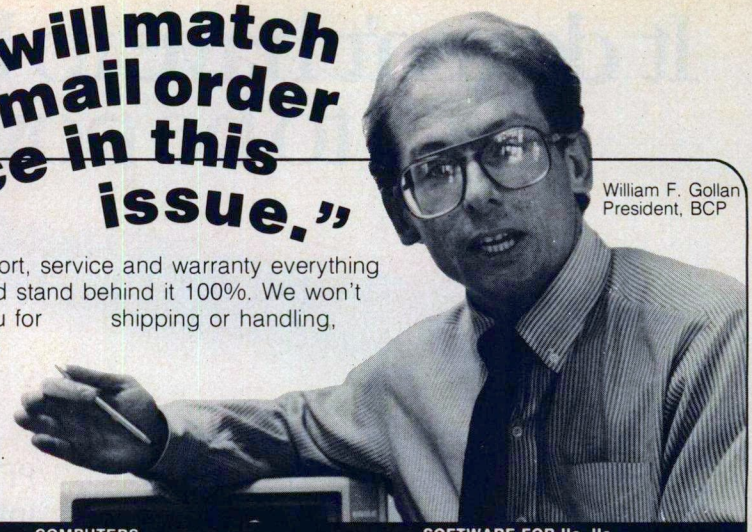

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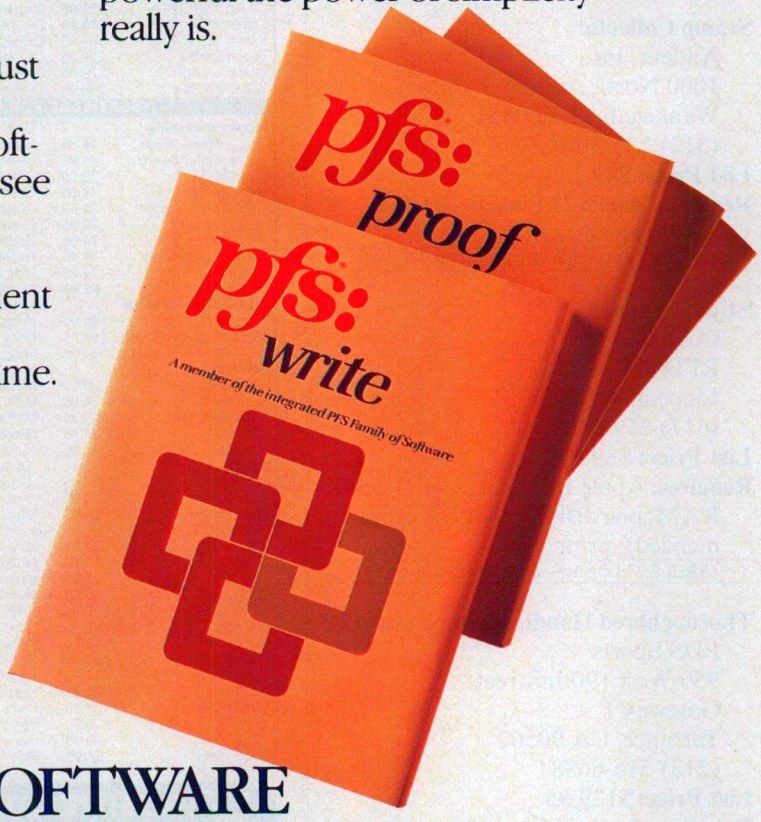

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HARDWARE/BY GARY B. LITTLE

A CLOSE LOOK AT RECENT ENHANCEMENTS IIe

As reported by J. Anthony Dirksen in the cover story of the April issue of *A+*, Apple Computer, Inc., announced an interesting enhancement to the Apple IIe in March 1985: four new chips to replace the 6502 microprocessor, the character-generator ROM, and the Applesoft and system-monitor ROMs in the original version of the IIe.

In his April article, Dirksen presented a general overview of the IIe enhancements. In this article, we will take a more detailed look at the enhancements and see how they improve the performance of the Apple IIe.

The main reasons for the enhancement were to make the IIe more compatible with the IIc and to facilitate the development of mouse-driven software. Apple did so by including 32 graphic icons (called MouseText) in the character-generator ROM and by rewriting the system-monitor output subroutine to work with them. Other reasons for the changes were to allow lowercase command entry from Applesoft and the system monitor; to improve the way the IIe responds to interrupts from peripheral devices; and to fix a few minor, but annoying, bugs that had cropped up in the code stored in the original IIe ROMs.

Despite the ROM changes, most programs written for the original IIe run properly on the enhanced IIe. Just to be safe, however, Apple informed most major software developers of the proposed ROM change well in advance of the public announcement, so that incompatibility problems could be cleared up before the new ROMs were in the hands of the general public.

All Apple IIe units manufactured after March 1985 were shipped with the four new chips already installed, and owners of the original IIe can have the chips installed by an authorized Apple dealer for about $70.

When you turn on an enhanced Apple IIe, the message Apple //e appears at the top of the screen (the original Apple IIe displays Apple)(). You can also examine two identification bytes in the system monitor to determine what version of the Apple II you are using. With this knowledge, you can write software that can use subroutines appropriate for your Apple II model.

PRIMARY	ALTERNATE	HEXIDECIMAL	PRIMARY	ALTERNATE	HEXIDECIMAL
@		$40	P		$50
A		$41	Q		$51
B		$42	R		$52
C		$43	S		$53
D		$44	T		$54
E		$45	U		$55
F		$46	V		$56
G		$47	W		$57
H		$48	X		$58
I		$49	Y		$59
J		$4A	Z		$5A
K		$4B	[		$5B
L		$4C	\		$5C
M		$4D	]		$5D
N		$4E	^		$5E
O		$4F	_		$5F

Figure 1: MouseText characters

The value stored at location $FBB3 (all hexadecimal numbers in this article have the prefix $) distinguishes an Apple IIe or IIc from other members of the Apple II family. If it's $06, then you're either working with the IIe (original or enhanced version) or the IIc. The value stored at $FBC0 indicates the precise version: $EA for an Apple IIe with original ROMs, $E0 for a IIe with the enhanced ROMs, and $00 for a IIc.

The New 65C02 Microprocessor

The new microprocessor for the Apple IIe, the 65C02, is the same as the one in the Apple IIc. As its name suggests, the 65C02 is a close relative of the 6502, which it replaces. In fact, every program that runs with the 6502 can also run with the 65C02 (with rare exceptions). The converse is not true, however, since the 65C02 has some ten instructions that are unknown to the 6502. Here are brief descriptions of these new instructions:

BRA—Branch relative always
DEA—Decrement accumulator
INA—Increment accumulator
PHX—Push the X register onto the stack
PHY—Push the Y register onto the stack
PLX—Pop the X register from the stack
PLY—Pop the Y register from the stack
STZ—Store zero in memory
TRB—Test and reset memory bits with accumulator
TSB—Test and set memory bits with accumulator

The actions of the first eight new instructions should be obvious to those who are familiar with assembly language. The last two instructions, however, require further explanation. TRB clears to 0 (resets) any bits of a byte at a given address, if the corresponding bit in the accumulator is 1. Conversely, TSB sets to 1 any bits of a byte at a giv-

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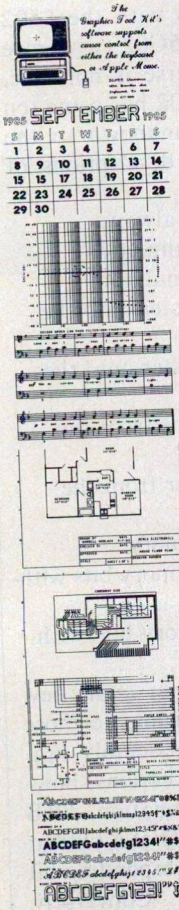

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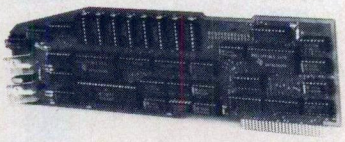

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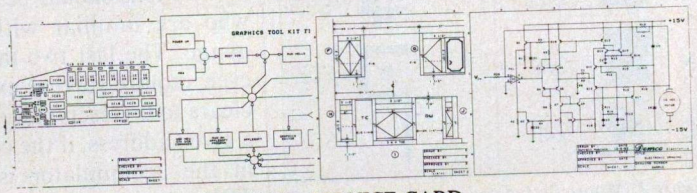


CIRCLE 171 ON READER SERVICE CARD

en address, if the corresponding bit in the accumulator is 1. The TRB and TSB instructions are most useful for clearing and setting software flags or manipulating the control registers of peripheral devices.

The 65C02 also supports two new useful addressing modes that some of its instructions can use: Absolute Indexed Indirect and Zero-Page Indirect.

Absolute Indexed Indirect. This addressing mode works only with the JMP (jump) instruction. Its assembler form is JMP ($1234,X). The computer calculates the effective address by first adding the value of the contents of the X-register to the address specified in the operand to get an intermediate location. The address stored at this intermediate location and the next location (two one-byte values to hold the 16-bit address) is the effective address, that is, the address to which the JMP instruction will pass control.

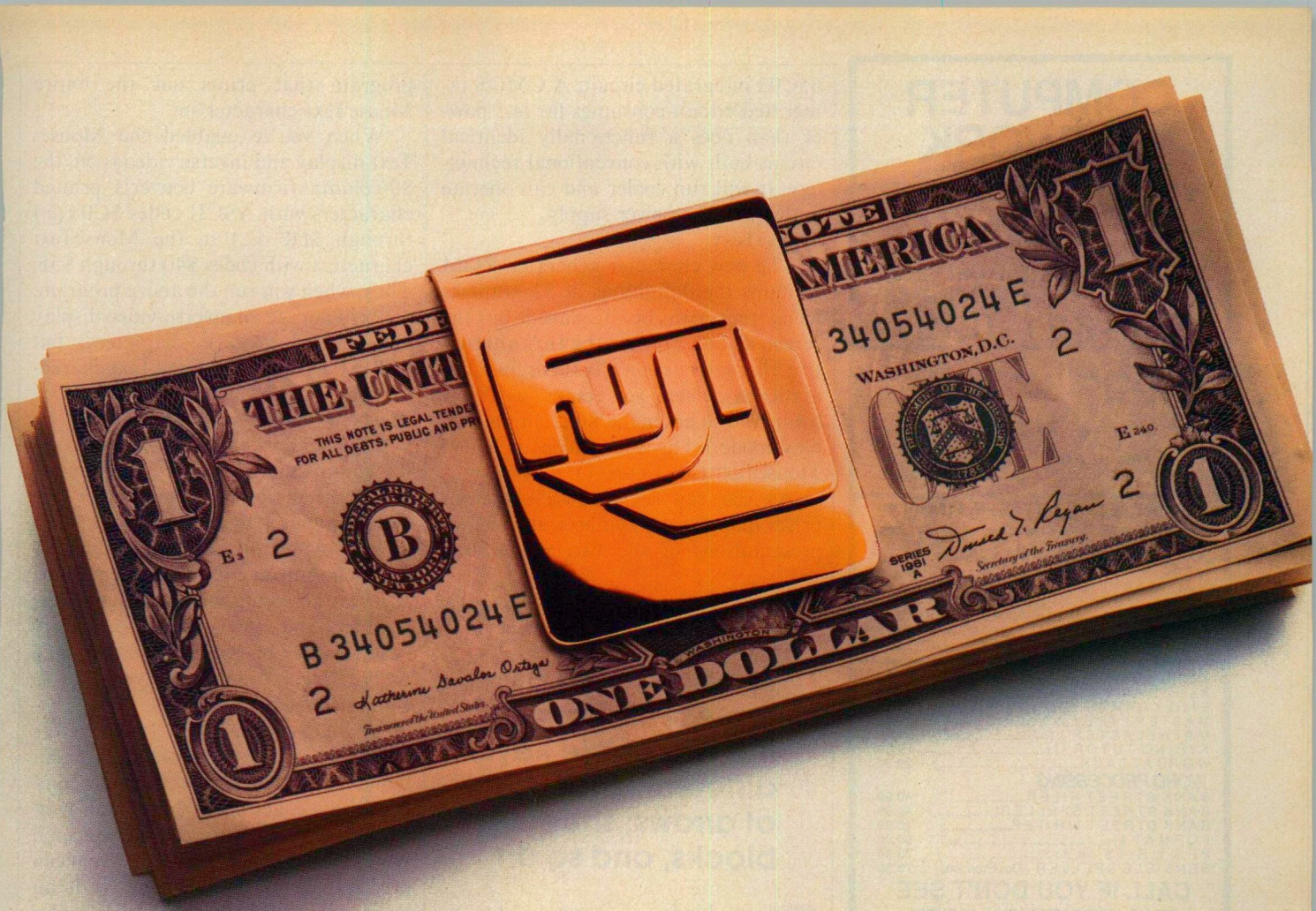
Zero-Page Indirect. The operand for this addressing mode is a single byte that represents a location in zero page (the first 256 bytes of memory). The effective address is simply the address stored at this location and the very next one. Thus, the Zero-Page Indirect mode is the same as the 6502's Zero-Page Indexed Indirect mode, but without the X indexing. You use an instruction of the form STA ($E0) with an assembler to select the Zero-Page Indirect mode.

Minor Differences

Several minor differences between the 6502 and 65C02 may affect the performance of some programs. For example, the execution times for some instructions are different, the BIT instruction behaves differently when you use the Immediate Addressing mode, and an indirect JMP command on a page boundary is handled differently. Because of a 6502 design error, a JMP ($xxFF) instruction transfers control to the address stored at $xx00 and $xxFF, not $(xx+1)00 and $xxFF, as you might expect. This instruction behaves properly on the 65C02.

If you want more information on the 65C02's instruction set and addressing modes, read the data sheet for the NCR Corporation version of the 65C02 (in the programmers' guide of the documentation that comes with the enhancement).

By the way, the *C* in 65C02 stands for CMOS, which stands for Complementary Metal Oxide Semiconductor—the name for the manufacturing process of the transistors that form the



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CIRCLE 137 ON READER SERVICE CARD

65C02 integrated circuit. A CMOS integrated circuit consumes far less power than does a functionally identical circuit built with conventional technology. It will run cooler and can operate with a smaller power supply.

MouseText

The new character-generator ROM contains the definitions of 32 graphics icons that can be displayed on the screen if you've turned the IIe's alternative character set on. (It turns on automatically when you enter a PR#3 command to enter the 80-Column Display mode.) This set of icons is called MouseText (see figure 1).

As you can see, MouseText comprises many useful symbols, such as representations of the two apple keys, different kinds of arrows, shading blocks, and so on. You can even display some of the icons next to each other to create other useful images, such as a running man or a file folder. As the name MouseText suggests, the icons are meant to be used primarily in programs that use the AppleMouse input device to point to and select commands and functions.

MouseText comprises many useful symbols, such as representations of the two apple keys, different kinds of arrows, shading blocks, and so on.

A MouseText icon appears on the video screen whenever a number between $40 and $5F is stored in the IIe's video-RAM memory. With the original IIe ROMs, these numbers correspond to inverse uppercase characters and six special symbols.

New subroutines in the IIe's 80-column firmware simplify the display of MouseText with standard Applesoft PRINT statements. Figure 2 is a short program that prints out the entire MouseText character set.

When you've enabled the MouseText display and inverse video is on, the 80-column firmware converts printed characters with ASCII codes $C0 (@) through $DF (_) to the MouseText characters with codes $40 through $5F. Thus, when you run the above program, you will not see an inverse-video display of standard ASCII characters, but rather the complete MouseText character set.

The New System Monitor

You can now enter all system-monitor commands in uppercase or lowercase characters. (You can enter the system monitor by typing CALL -151 in the Applesoft Command mode.) Other improvements are the inclusion of a Search command and a simple assembler and the ability to specify ASCII codes by character rather than by hexadecimal code.

Entry of ASCII Characters

You can now use ASCII characters with the system-monitor Store command (:) or any other monitor command in a much more convenient way. Rather than entering the hexadecimal ASCII code for a character, you can precede the character itself with an apostrophe (')—that's the character on the key to the immediate left of Return. For example, use ' G instead of C7 to enter the ASCII code for *G*.

Here's what to enter to place the word *Inside* into memory, beginning at $300 (don't type the asterisk—it's just the monitor's prompt symbol):

```
*300:'I 'n 's 'i 'd 'e
```

Notice that each ASCII character is separated from the next by a blank space.

The Search Command

The new system-monitor ROM includes a Search command that allows you to find one- or two-byte patterns stored in a specified area of memory. To find a two-byte pattern, say ED FD, in the standard system-monitor area beginning at $F800 and ending at

```
100  PRINT CHR$(4);"PR#3": REM SELECT 80-COLUMN FIRMWARE
200  PRINT CHR$(27);: REM TURN ON MOUSETEXT FEATURE
300  INVERSE: REM  TURN ON INVERSE VIDEO
400  PRINT "@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_";
401  REM  PRINT THE STANDARD ASCII CHARACTERS
402  REM  THAT CORRESPOND TO THE SPECIAL MOUSETEXT
403  REM  CHARACTERS THAT ARE TO BE DISPLAYED
500  NORMAL: REM  TURN ON NORMAL VIDEO
600  PRINT CHR$(24): REM  TURN OFF THE MOUSETEXT FEATURE
```

Figure 2: A program that prints out the MouseText character set

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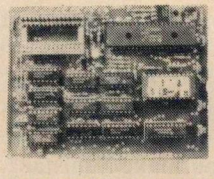

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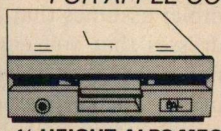

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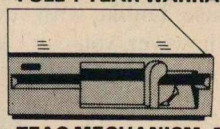

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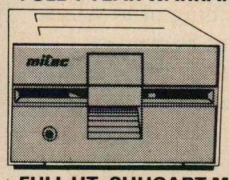

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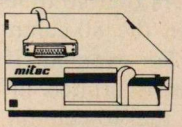

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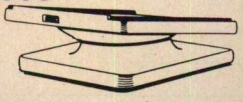

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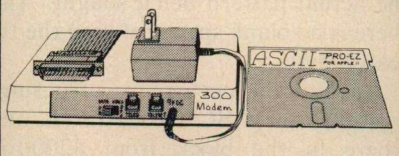

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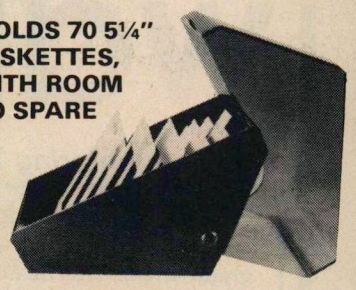

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$FFFF, you use the command

```
*FDED <F800.FFFFS
```

When the monitor finds a matching pattern, its address appears on the screen, followed by a hyphen.

Notice that the byte pattern the command line specifies is the reverse of the actual pattern being sought. Also, there is no blank space between the two search bytes.

To find the occurrence of a single byte, say the ASCII code for *L*, anywhere in the block from $2000 to $2FFF, use the command

```
*'L <2000.2FFFS
```

You can still specify the ASCII code for *L*, of course, instead of using the tick notation.

The Mini Assembler

Another useful addition to the system monitor is a "mini assembler" that you can utilize to enter 6502 programs quickly in the assembly-language (mnemonic) form, rather than in machine-language (hexadecimal) notation. Unfortunately, the mini assembler does not recognize the ten new instruction mnemonics unique to the 65C02.

To enter the mini assembler from the system monitor, type the ! command, after which the mini assembler's ! prompt symbol will appear and you can start entering a program.

To enter a program line, first type the address of the 6502 instruction, a colon, and then the instruction mnemonic and its operand. If you do these steps properly, the starting address of the instruction, the hexadecimal bytes for the instruction, and the instruction mnemonic and operand will appear on the screen. If you make a mistake, you will hear a beep, the line will reprint, and a ^ will appear beneath the character that caused the error.

After you've successfully entered the first line, you can put in subsequent lines by just typing a space and then the next instruction; the generated code will end up in succeeding memory locations.

The mini assembler assumes that all numbers and addresses that you enter are in hexadecimal form, even if you don't use a leading $. The instruction mnemonics and operand formats that it recognizes are the standard ones that most assemblers use. Unlike with standard assemblers, however, you can't use symbolic labels for memory locations or data.

To leave the mini assembler and return to the system monitor, press Return at the beginning of any line.

Changes in Escape Sequences

Two new keyboard Escape sequences have been added to the IIe's standard input subroutine: Escape-Control-D and Escape-Control-E.

Escape-Control-D disables the printing of any control characters that are sent to the standard output subroutine, other than the codes for carriage return ($8D), line feed ($8A), backspace ($88), and bell ($87). The IIe reacts in special ways to several other control characters that go to its output subroutine when the 80-column firmware is in use. For example, if a Control-U character is printed in the 80-Column mode, the 40-column display will be turned on.

This method is handy for exiting from the 80-Column mode, but what if you happen to be communicating with a remote computer through a modem and it sends you a Control-U character for some reason? Before you know it, you will pop out of the 80-Column mode, and you will be left scratching your head, wondering what happened. To avoid this type of trouble, you should enter the Escape-Control-D sequence before running such a program. You

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CIRCLE 343 ON READER SERVICE CARD

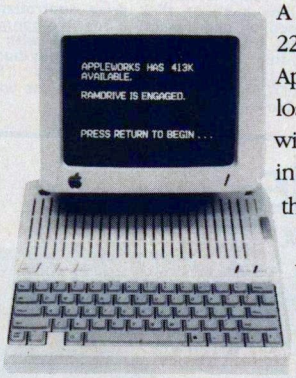
Expanding Your IIc Is Easy With Z-RAM

Applied Engineering and Apple computer have teamed up to take your IIc to new heights.

Applied Engineering's Z-RAM card for the IIc is available with 256K or 512K of additional memory and a powerful Z-80 microprocessor for running CP/M software.

Z-RAM fits neatly inside the IIc. Installation is easy, clear instructions show you how. You'll need a screwdriver and about 10 minutes (if you can change a light bulb you can install Z-RAM).

Z-RAM and Appleworks will knock your socks off.



A 256K Z-RAM will give you a 229K available desktop and Appleworks will be completely loaded into memory. Appleworks will now run about 10 times faster in your IIc with 1 disk drive than in other IIc's with 2 disk drives. A 512K Z-RAM will give you a 413K available desktop. A 256K Z-RAM can be upgraded to 512K by just plugging in more memory chips.

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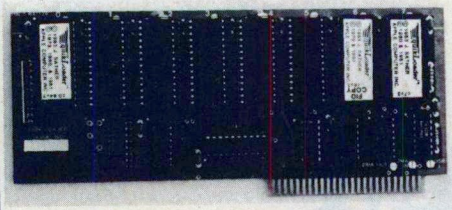

designed by Jim Sather

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SYSTEM REQUIREMENTS

The quikLoader plugs into any slot of the][,][+, or //e. If installed in a][+, a slightly modified 16K card in slot Ø is suggested. A disk drive is required to save data.

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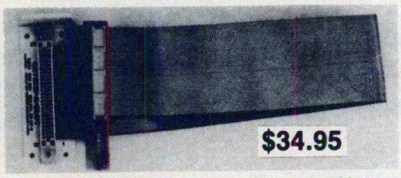

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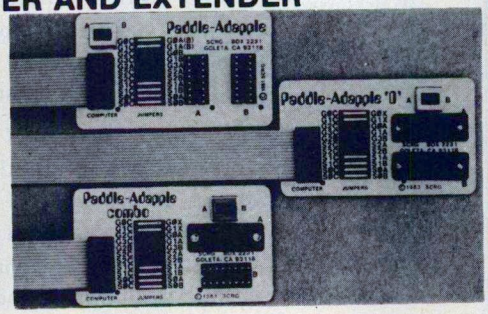

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can reenable the handling of the control codes later by entering the Escape-Control-E sequence.

The enhanced ROMS do not let you use the Escape-command sequences Escape-R and Escape-T. In the original ROMs, these sequences activate and deactivate an input mode in which all lowercase text that is not entered within quotation marks is converted to uppercase. This mode is no longer required, since you can now enter Applesoft and system-monitor commands in both uppercase and lowercase characters.

Interrupt Handling

The Apple II, II Plus, and original IIe handle interrupt requests (IRQs) badly because both DOS 3.3 and the system monitor use location $45 for data storage. The problem arises because this location is overwritten when an interrupt occurs, which obliterates its proper contents. With the enhanced IIe ROMs in place, however, the integrity of $45 is preserved and interrupts go smoothly.

When a peripheral device makes an interrupt request on the enhanced IIe, control now passes to the IIe's internal interrupt-handling subroutine at location $C3FA. This subroutine ultimately passes control to NEWIRQ at $C400. NEWIRQ is responsible for saving the state of the system when the interrupt occurs and then setting it to the following standard state:

- Main memory is active for reading and writing.
- The ROM space from $D000 to $FFFF is active.
- The main stack and zero page are active.
- The main text page is active.
- If the alternative stack is active, the current stack pointer is stored at $101 (in the alternative stack), and the main stack pointer is set equal to the value stored at $100 (in the alternative stack). For this scheme to work properly, any program that turns on the alternative stack must also store the value of the main stack pointer at $100. Here's the code that will do the trick:

```
PHP          ;Save status
SEI          ;Disable interrupts
             ;for this
STA $C009    ;Turn on alternative
             ;stack
TSX          ;Transfer SP to X
STX $100     ;Save main SP
PLP          ;Restore interrupt
             ;status
```

After the subroutine has saved the value of the main stack pointer at $100, NEWIRQ sets up the alternative stack pointer.

Once NEWIRQ has set up this standard state, the interrupt handler calls the user's own interrupt handler (its address is stored at $3FE/$3FF). After it finishes (with an RTI—return from interrupt—instruction), the system goes back to its original state, and control returns to the interrupted program.

Slot 3 Peripheral Cards

When you turn an original Apple IIe on or press Reset, the internal slot-3 firmware is always enabled if an 80-column text card is installed or disabled if it is not.

The situation is different with the enhanced Apple IIe. If slot 3 contains a peripheral card that has the identification bytes $C305 = $38 and $C307 = $18, then the peripheral-card slot-3 firmware is turned on, even if an 80-column text card is also installed. Thus, the slot-3 peripheral, not the 80-column text card, will be used when you enter a PR#3 command.

The firmware in such a slot-3 peripheral card must contain a special sequence of four instructions beginning at $C3F4 to use the IIe's new internal in-

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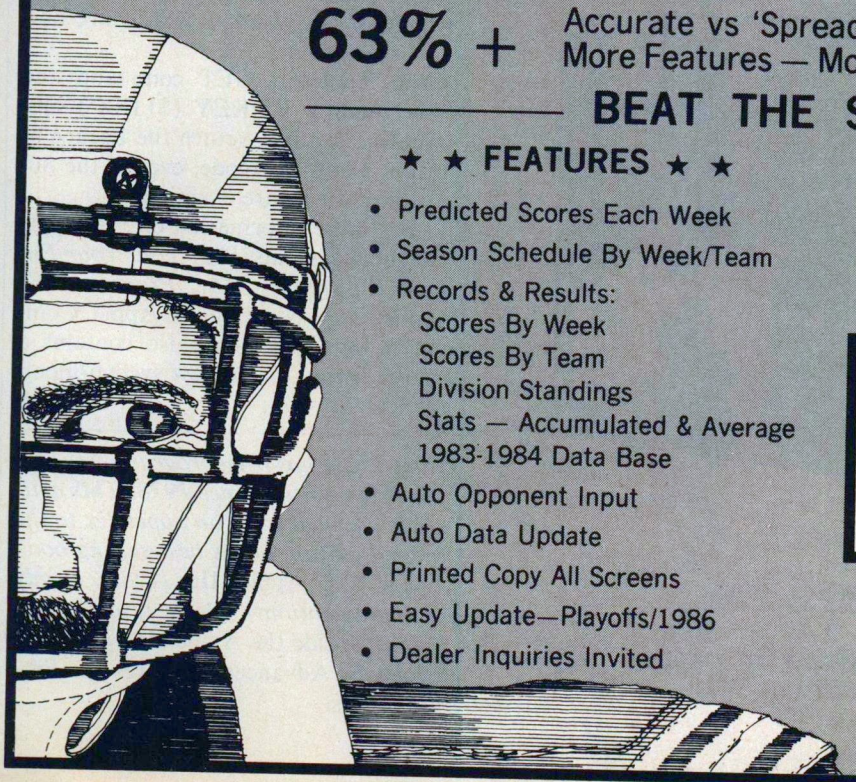

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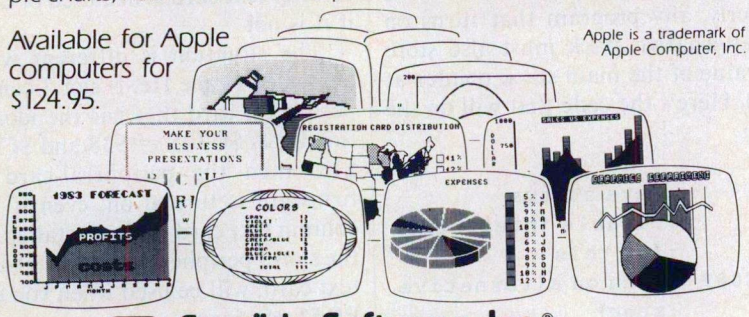

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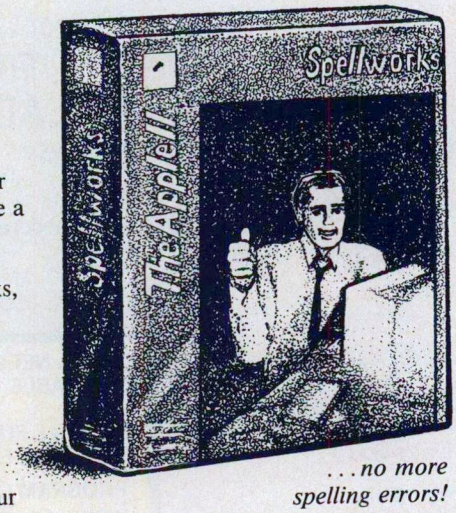

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terrupt-handling subroutine:

```
$C3F4: STA $C081  ;Read ROM,
                  ;write RAM
       JMP $FC7A  ;
       BIT $C015  ;Get inter-
                  ;nal "$Cx"
                  ;ROM status
       STA $C007  ;Select in-
                  ;ternal ROM
```

If these instructions are not present, you will not be able to use interrupts on the new IIe.

Here are some of the more interesting features and bug fixes that have been incorporated into the new ROMs:

- You can now enter Applesoft commands in uppercase or lowercase characters.

You can now enter Applesoft commands in uppercase or lowercase characters.

- 80-column screen clearing and scrolling are dramatically faster.
- You can boot directly from a ProFile hard disk when you turn on the IIe or press Reset.
- The bug-induced Escape-Control-L sequence that transfers control to $4CCE is gone.
- The code for the Applesoft HTAB, TAB, SPC, and PRINT commands has been rewritten to ensure that these commands work properly in the 80-Column mode.
- Even or odd window widths are now possible.
- The Applesoft GET command and the monitor RDKEY ($FD0C) subroutine can now return the Escape or right-arrow key code, even if the 80-column firmware is active.

For more information on the Apple IIe enhancements, see *About Your Enhanced Apple IIe: Programmer's Guide*, a publication of Apple Computer, Inc. This book also contains a source listing of the new system-monitor ROM. ✚

Gary Little has been programming Apple II computers since 1978. This article is adapted from an appendix to the second edition of his best-selling book Inside the Apple IIe *(1985, Brady Communications). He is also the author of* Inside the Apple IIc *and* Apple ProDOS, Advanced Features for Programmers.

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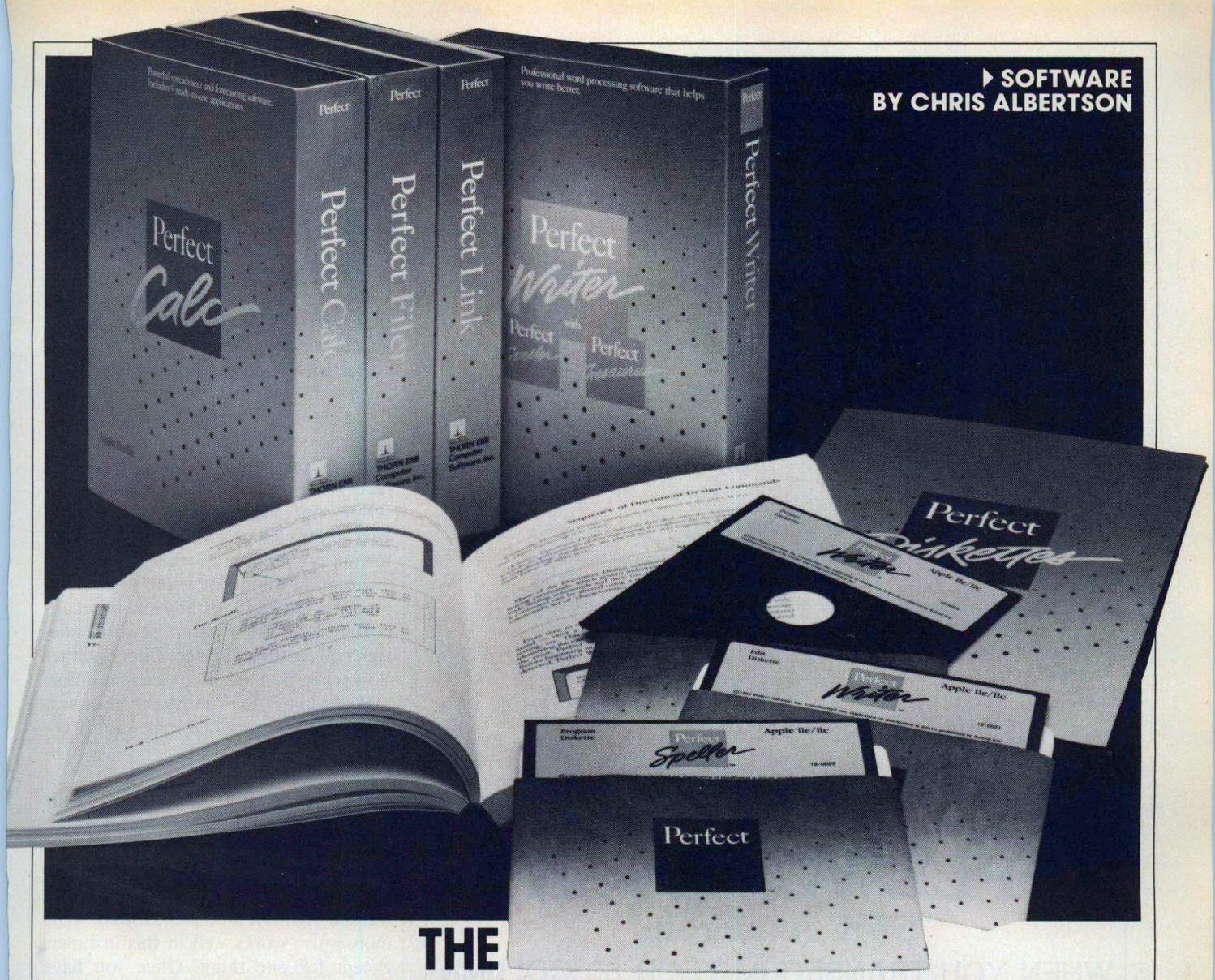
BY CHRIS ALBERTSON



THE PERFECT 2.0 SERIES

IT LOOKS NICE IN DOS 3.3, BUT IS IT REALLY PERFECT?

The Perfect Series (Perfect Writer with Perfect Speller and Perfect Thesaurus; Perfect Filer; Perfect Calc; and Perfect Link) has undergone some changes recently. The original version of the series operated under CP/M and made a name for itself by being bundled in with CP/M computer systems (notably Kaypro) as part of the base price of the computer. The idea was that you bought the computer and got the software at no additional cost.

As you may or may not know, the Perfect Series was bought by Thorn EMI, a huge British conglomerate that also makes records, tapes, and films. Thorn EMI then spent a lot of money upgrading the software to work with the Apple native operating system, obviating the need for a CP/M card. During the upgrade process, the Perfect Series programs were revamped to make use of the mouse and pull-down menus. Unfortunately, not enough time was spent on making the series truly perfect.

Perfect Filer

Perfect Filer (PF) is the extremely flexible and efficient database program in the Perfect Series. It actually lives up to the manufacturer's description, in that it requires a minimum of disk swapping, the cursor keeps up with the speediest fingers, and even the mouse is controllable. With the help of PF's well-conceived menus—and a little bit of logic—novice computerists can soon learn to create a database, such as a mailing list, from which they can extract information for a form letter.

Creating a record form is easy with the program's many prestructured entries, which include Date, Money, Time, Social Security, and Phone formats, as well as Yes/No options. A Record ID format automatically registers incremented values from 00001 to 32767. Name and address entries are also built in.

The time you save by having a stored template available for immediate use is obvious, and if all of the above entries constitute more information than you wish to have in your database, modification is simple. The Escape key produces the Group Entry menu, from which you can select these prestructured data-entry templates. The program then sends them to the screen. Because you can enter other field definitions manually, PF has the kind of structural freedom that PFS programs from Software Publishing Corporation introduced to Apple databases in 1981.

PACIFIC HORIZONS

```
ENTRY NAMES, POSITIONS AND LENGTHS FOR RECORD FORM "CARDLIST" 03/11/85

   entry #   row    column  length   name

       1       1       12      18    NAME.LASTNAME
       2       1       38      18    NAME.FIRSTNAME
       3       1       65      15    NAME.MIDDLENAME
       4       4       11      35    GREETING.
       5       6       15      65    ADDRESS.ORGANIZATION
       6       7       15      65    ADDRESS.ADDRESS1
       7       8       15      65    ADDRESS.ADDRESS2
       8       9       15      21    ADDRESS.CITY
       9       9       44      20    ADDRESS.STATE
      10       9       70      10    ADDRESS.ZIPCODE
      11      10       15      30    ADDRESS.COUNTRY
      12      10       52      28    ADDRESS.ATTENTION
      13      12       11       3    MARRIED.YESNO
      14      12       29      51    SPOUSE.
      15      14       12      68    CHILDREN.
      16      16       18       3    CURRENT.YESNO
      17      16       67       3    PROSPECT.YESNO
      18      18       10      70    COMMENT.
      19      20       15       8    DATE_ENTER.DATE


SCREEN DEFINITION FOR RECORD FORM "CARDLIST"

....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|....|
Last name: #1_______________ First: #2_______________ Middle: #3_____________

Greeting: #4_____________________________________

Organization: #5_____________________________________________________________
     Address: #6_____________________________________________________________
              #7_____________________________________________________________
        City: #8____________________ State: #9_____________ Zip: #10_______
     Country: #11_____________________________ Attn: #12_____________________

Married:  #13      Spouse:  #14_____________________________________________

Children:  #15___________________________________________________________

Current Client:  #16                          Prospective Client:  #17

Comment: #18_____________________________________________________________
Date Entered: #19__/__
```

Figure 1: Perfect Filer's structure-display printout is a well-organized, practical reference sheet containing all the information you need to facilitate record entry.

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Once you have designed your record structure, PF produces a printout of it, along with a listing of all the entry names, their positions, and the length of each field (see figure 1). The Display Structure command in dBASE II pales by comparison to this feature. You will find this printout to be of immense value when you're composing form letters or simply retrieving data.

Perfect Filer's practical uses are further expandable through the simple way in which it integrates with the other Perfect Series programs. After creating a small mailing-list type of file with PF, I wrote a short form letter, using Perfect Writer, and merged the two files for printing. Unfortunately, Perfect Writer's slow pace (which I describe later in this article), coupled with PF's unhurried process in extracting information, made it quickly apparent to me that I would not want to use this program package for any sizable mailing. Yes, for all of its praiseworthy design and features, Perfect Filer is rather slow when it comes to processing information, but I don't fault the designers of the program as much as I fault the nature of DOS 3.3.

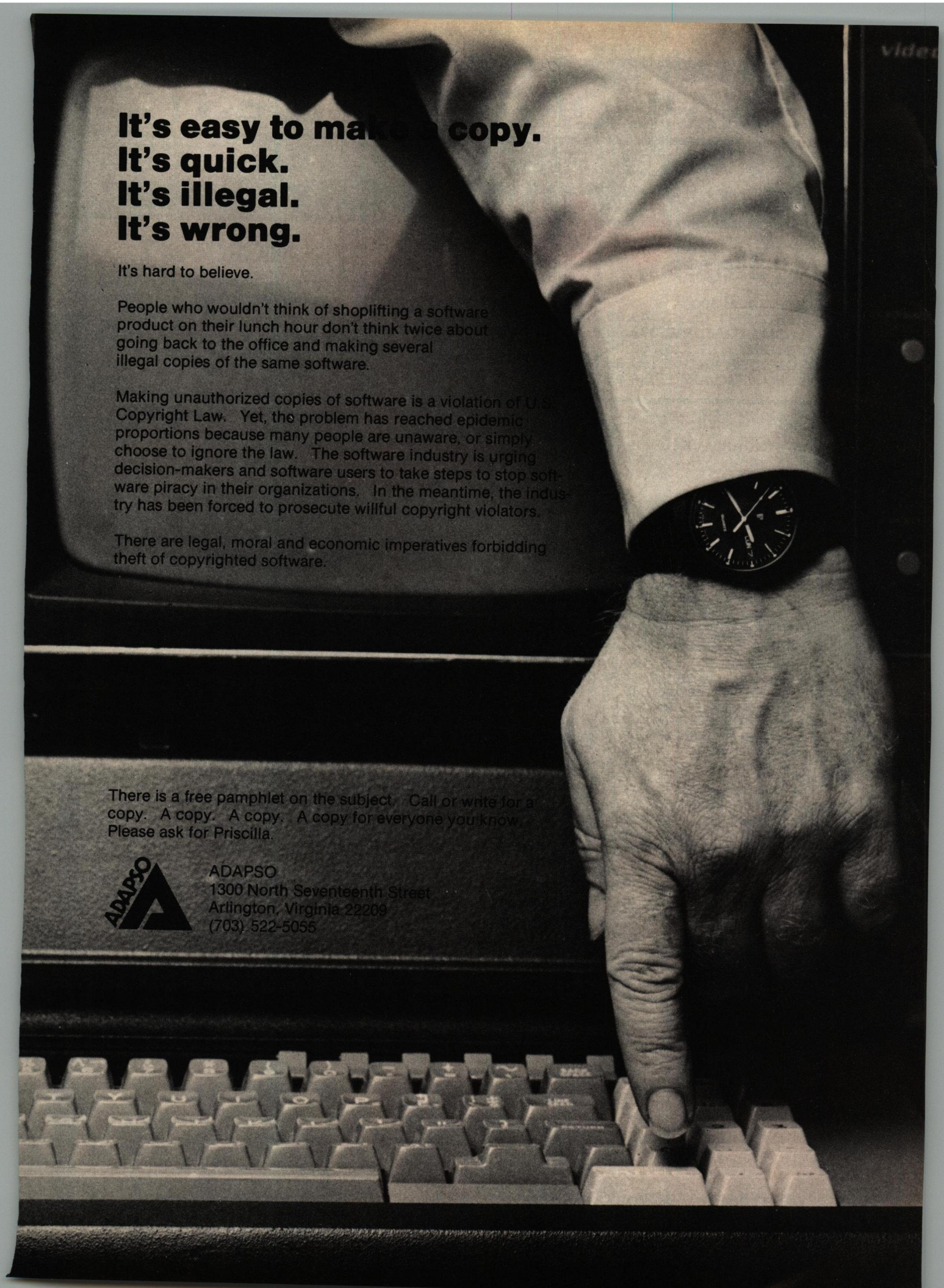
Perfect Calc

The same goes for Perfect Calc (PC), which takes its time but does the job. With the pop-up command menus only a key away, I found myself easily creating "little" spreadsheets that worked the first time around. The mouse also works well in this instance, except for one thing: Once you have used it to pop up a menu (two clicks) and run the selector to the desired line, you had better keep that mouse in the very same spot until you have picked an item (another two clicks). The slightest movement of the mouse sends the menu into limbo and places your cursor in a spot where you would most likely not wish it to be. No wonder Thorn EMI mentions the mouse capability of the Perfect Series only in fine print at the bottom of its magazine ads.

I mentioned that I had created little spreadsheets with PC, but don't take that to mean that the program isn't capable of tackling larger, more involved jobs. It is—if you don't mind a long wait. Much as I like the plain English of the menus and the mere fact that it boasts such features as synchronized windows and a chi-square analysis program, I don't see myself switching the few spreadsheet chores I have to this Perfect Calc.

Perfect Link

I have to say that Perfect Link (PL),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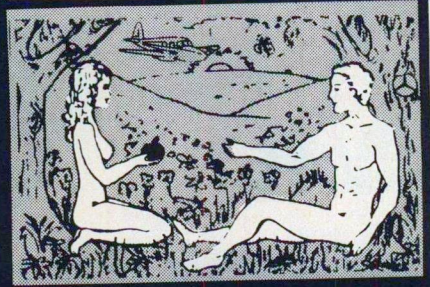

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the communications program, does not take well to the mouse. In fact, just a click of my mouse was enough to freeze PL so solid that it required a reboot. On the positive side is the fact that PL allows you to program keys A through J, a feature that can save on-line time by enabling you to place lengthy commands one keystroke away. Apart from that, however, Perfect Link does not have any features that separate it from the average program of this kind. I have seen equal or better software accompany modems. Not surprisingly, PL's manual is mostly devoted to a description of various time-sharing systems and how to log on to them. In short, this program looks good in a package but fails to impress on its own.

Perfect Writer

Finally, the word-processing program, Perfect Writer (PW), comes in a package of three double-sided (flippy) disks that includes Perfect Speller, a 50,000-word dictionary, and Perfect Thesaurus. The latter should save you time when you need to check for synonyms, but I was soon reaching for the old Roget volume on my bookshelf. Speed—the lack of it—is the DOS 3.3 version's major problem, and the snail's-paced operation is not restricted to the spelling checks. It took 15 seconds to justify a ten-line paragraph, and even a two-finger typist like me can enter a sentence and then look up from the keyboard in time to see the characters appear on the screen.

If an AppleMouse is connected to the computer, all but one of the programs in this series (Perfect Link) will automatically take advantage of it. Just imagine the program keeping up with the pace of a mouse when it had a hard time following my fingers, however. In the case of PW, the pop-up command menus—which give the new Perfect Series an attractive Macintosh look—are overwhelmed by the speed with which the mouse scans their contents. The result is that they often flicker in a most annoying way. Furthermore, I soon abandoned any attempt to move the cursor with the mouse. The mouse simply becomes uncontrollable and tries, with an alarming measure of success, to make your text scroll where no text has scrolled before. Perfect Writer makes the mouse supersensitive: I was entering a filename when my arm accidentally moved the mouse a fraction of an inch, which deleted my entry. Since you cannot disengage the mouse by means of the software, my advice is to move it out of the way.

Another annoyance is a prompt that requests the insertion of the Apple Writer Program Disk. There is no disk bearing that label. I believe the prompt refers to the disk labeled Edit Diskette, but I cannot be absolutely sure, because that disk produced a Swap Write Error message two different times. Rather than store the current work file entirely in RAM, Perfect Writer creates a 32K Swap file on the data disk and moves data back and forth to facilitate editing. This procedure allows the use of files whose length exceeds the computer's RAM capacity, but it also opens the door to trouble. I never got the old Swap File Not Found notice that was part and parcel of the earlier Perfect Writer, but version 2.0 delivered several Swap File Full! and Bad Document Read messages.

Printing a Perfect Writer file is a real chore, for even if you are using two disk drives, you must endlessly swap printer and data disks. The printer-configuration disk offers a menu of about 16 compatible printers, but here again, PW's design is awkward. You

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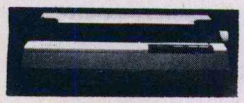

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must configure PW to work with one of these printers in one particular mode. In other words, configuring the program for my Okidata ML 92 printer, I was given a choice of draft, 12-pitch, condensed, or correspondence quality. If I want to print a quick draft before going to correspondence quality, I have to prepare one printer disk for each output! Incidentally, having a high-speed printer is no advantage, because PW needs time to "think" before committing each line to paper.

Once it gets going, PW delivers onto paper what it has promised. By the time the printer finally starts moving, though, the frustration of getting started tends to diminish your appreciation of the final results. To be honest, I did not try the indexing and table-of-contents features, because even if they work like a charm, no amount of bells and whistles can make up for the inferior design of this program.

Not Perfect

The manuals are well written, with step-by-step instructions in simple, literate English and a comfortable number of figures and illustrations. The attractive packaging makes the Perfect Series look and read better than it performs, at least with the Apple IIe and IIc versions. Perfect Filer and Perfect Calc are adequate applications. Perfect Link has some nice features but some serious flaws. Perfect Writer is the weakest of these programs. It seems to be suffering from poor design in the earliest stages, and dressing it up with pop-up menus and eye-catching boxes cannot change the situation.

Overall, the Perfect Series is not perfect. Don't look to it to meet all of your computing needs. +

Chris Albertson is a New York music critic who has been using Apple computers since 1979.

▶ PRODUCT INFORMATION

Perfect Series, Version 2.0
Thorn EMI Computer Software
1881 Langley Drive
Irvine, CA 92714
(714) 261-6600

List Price: Perfect Filer, Perfect Calc, and Perfect Writer, $139 each; Perfect Link, $109

Requires: Apple IIe with 128K RAM and Extended 80-Column Card, or Apple IIc; one disk drive (two recommended); modem, for Perfect Link

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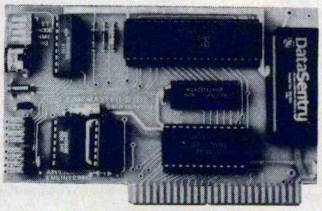

- Absolutely, positively, totally PRO-DOS and DOS 3.3 compatible.
- Time in hours, minutes, seconds and milliseconds (the ONLY PRO-DOS compatible card with millisecond capability).
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- The only card recognized by both the DOS 3.3 and PRO-DOS versions of Apple Writer IIe.
- Appleworks will now time and date stamp all your data automatically.
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	PRO-DOS COMPATIBLE	INCLUDES DOS DATER	MILLISECOND TIME	YEAR DATA	LARGEST SAMPLE SOFTWARE	REMOTE SET PORT	BSR PORT	EMULATES ALL OTHER CLOCKS
H.O	YES	YES	YES	YES	YES	YES	YES	YES
BRAND A	NO	NO	YES	NO	NO	NO	NO	NO
BRAND C	NO	NO	NO	NO	NO	NO	NO	NO
BRAND M	NO	NO	NO	NO	NO	NO	NO	NO
BRAND P	YES	YES	NO	YES	NO	NO	NO	NO
BRAND S	NO	NO	NO	YES	NO	NO	NO	NO
BRAND T	YES	NO	NO	NO	NO	NO	YES	NO

Full emulation of all other clocks. Yes, we emulate Brand A, Brand T, Brand P, Brand C, Brand S and Brand M too. It's easy for the H.O. to emulate other clocks, we just drop off features. That's why the H.O. can emulate others, but none of the others emulate us. The Timemaster II H.O. will automatically emulate the correct clock card for the software you're using. Of course most programs will use the Timemaster II H.O. in its native mode, but it's comforting to know that you won't have to worry about compatibility problems. You can also give the H.O. a simple command to tell it which clock to emulate. This is great for writing programs for those poor unfortunates who bought some other clock card.

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- All new design (using a new Microprocessor-based C.R.T. controller) for a beautiful razor sharp display.
- The VIEWMASTER incorporates all the features of all other 80 column cards, plus many new improvements.

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VIEWMASTER	139	YES	YES	YES	YES	YES	YES	YES
SUP'RTERM	MORE	NO	NO	NO	NO	NO	YES	YES
WIZARD 80	MORE	NO	NO	NO	YES	NO	YES	YES
VISION 80	MORE	YES	NO	NO	YES	NO	NO	NO
OMNIVISION	MORE	NO	NO	NO	NO	NO	YES	YES
VIEWMAX 80	MORE	YES	NO	NO	YES	NO	NO	YES
SMARTERM	MORE	YES	NO	NO	NO	YES	YES	NO
VIDEOTERM	MORE	NO	YES	NO	YES	YES	NO	YES

The VIEWMASTER 80 works with all 80 column applications including CP/M, Pascal, WordStar, Format II, Easywriter, Apple Writer II, VisiCalc, Dollars and Sense, and all others. The VIEWMASTER 80 is THE MOST compatible 80 column card you can buy at ANY price!

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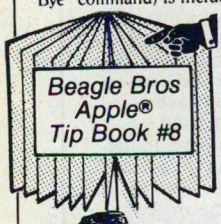

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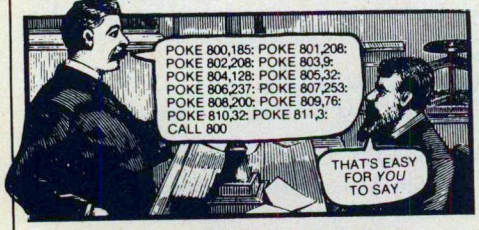

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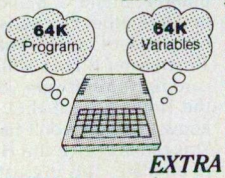

Your Applesoft programs can now function undisturbed in main memory while all variables, strings and other data reside in your Apple's massive extra 64K. Everything functions normally—no special commands or procedures required.

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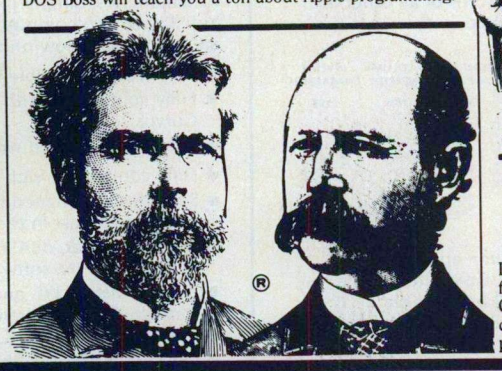

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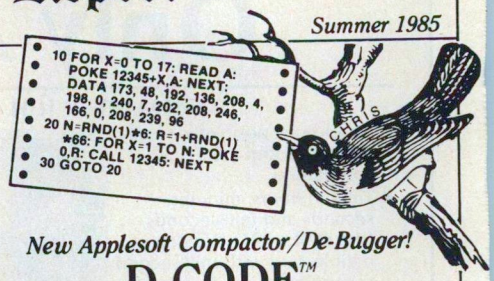

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When a program stops or crashes, type "DUMP" to see the last 10-10,000 statements and line numbers that were executed, in the order executed—an instant program *history.*

D CODE features sophisticated "live" tracing too, with each executing statement, line number and selected variable values appearing in a window at the bottom of the screen:

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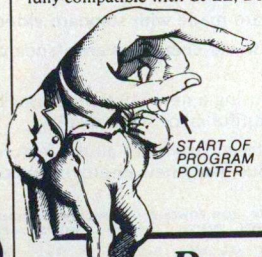
GPLE COMPATIBLE

D CODE remains "transparent" to your programs and is fully-compatible with GPLE, Double-Take, ProntoDOS, etc.




```
1  HOME: HTAB 5: POKE
   33,28: FOR C=1 TO 92:
   POKE 50,255-192*
   (C=4 OR C=64)
9  J=J+1-31*(J=31):
   PRINT CHR$(9+(J=1));
   SPC(2+(J<10))J;:
   NEXT: PRINT
85 POKE 33,1: PRINT
   "JULY..AUG..SEPT...."
```

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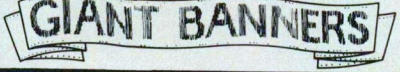

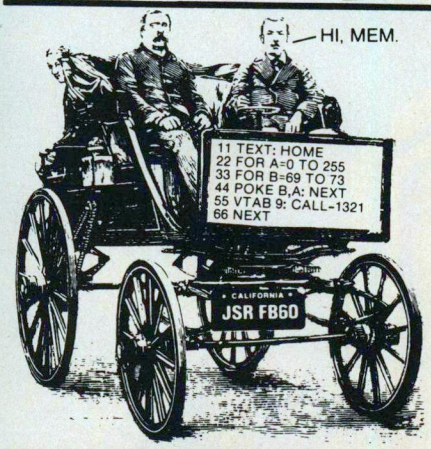

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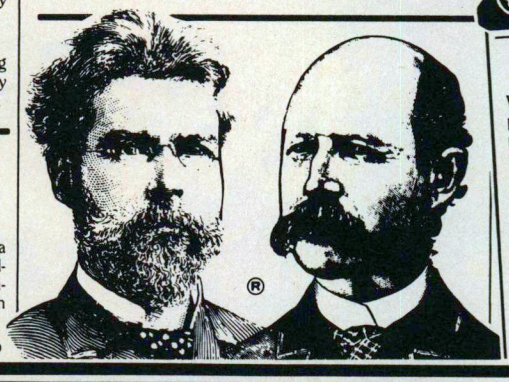

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ADRIAN DAY

THE CHALLENGE: TO UNEARTH SOME COMPUTER RELICS

IN SEARCH OF EARLY APPLES

You may not be Indiana Jones, but you can still be a Raider of Lost Apples.

You see, the personal-computer industry hasn't even reached its teens, but it's still old enough to have amassed books and articles chock-full of memorabilia, as well as its fair share of historical artifacts.

For Apple Computer, Inc., which, more than any other company, has brought computers to the public, those artifacts are the original Apple computers. And those first Apples lie buried in the closets or on the computer desks of you readers, beyond the ken of mere magazine editors.

We attempted what we thought was a simple experiment a couple of months back: We thought we'd locate the first ten Apple I or Apple II computers. At first we assumed the task would be easy, perhaps requiring a few phone calls. But the project quickly mushroomed into a full-scale archaeological dig, as we found ourselves burrowing through layers of old sales receipts and computer stores' ancient history, sifting for chips and shards of the past.

What we've come up with so far are scattered pieces of the puzzle, a few of the stories behind those first purchases. Before you dig for your own serial number underneath the stack of software, let us fill you in on what we've already discovered.

Probing the Strata

The top layer comprised the first distributors and retailers who sold Apple machines to hobbyists.

Number 12 has been retired after years of yeoman service to John Simonton in Oklahoma City, Oklahoma, who purchased it when he and Charles Weddington were wholesale computer-parts distributors back in 1976. "We started our store to get computer gear at a lower price," jokes Simonton.

Weddington, now president of Hi-Technology Software Products, remembers that the early machines had thicker, less-finished cases without air vents on the sides and rear, "because they were trying to ship just the product."

Simonton extracted number 12 from their first shipment of Apple IIs shortly after it came in, because of its low serial number. The rest of the machines went on to retailers such as the Compu-Shop store in Texas.

We were not looking at it and thinking 'This is going to be history.' We were saying, 'I hope we make money.'

Simonton eventually formed his own company, Paia Electronics, manufacturers of electronic music kits. Until about six months ago he was still using old number 12 as a software-development system, with the Paia board as the target system.

Warren Winger, owner of Compu-Shop, didn't do badly in his distribution agreement with Simonton and Weddington. Winger, owner of what is now a 53-store, 13-state chain based in Dallas, says he owns Apple II number 11. His company bought that machine back from its original owner, one Cid Newberry of Garland, Texas.

"We found the sales ticket, got ahold of him, and traded him an Apple III for it," says Winger.

Winger had sold that first Apple II, the only one the store sold that month, on July 16, 1977—he keeps the machine and sales ticket safely in his closet. He recalls that the documentation was "ten mimeographed pages. There was zero software for it, no interfaces, just a prototyping card for hobbyists."

That first buyer, a true hobbyist, couldn't bring himself to buy the machine until he saw it actually accomplish something. He and Winger tinkered with the machine for hours trying to bring up its reputed color graphics. Garland's abashed wife eventually took Winger aside and assured him, "I hope you'll forgive my husband; he really does want to buy the machine. He just wants to see it do something."

As soon as a few color dots appeared, Garland plunked his money down. The retail cost for this bare-bones 16K computer with no interfaces, no cassette recorder, no disk drive—no nothing—was (in case you've forgotten) $1678 plus tax.

"That's when happy, sleepless nights were the nature of the business," Winger reminisces. He recalls selling an 8K memory board for $225 at around the same time. "We don't even *have* chips as small as 8K anymore," he laughs.

Museum Treasures

One Apple I has found a home in the Computer Museum in Boston, Massachusetts. This particular relic rests beside other personal-computer ancestors, such as the Altair and the Xerox Alto. Early Apple staffers say that Apple I

serial numbers began in the 8000-100s (and only about 210 of the machines were made); this machine's number is 8000-10.

Another ancestral Apple found a home in a museum, eventually. Steve Headley, computer-science instructor at Homestead High School in Cupertino, California, allows that one of his former students surreptitiously donated to the school a special Apple II, one that "came from parts and pieces put together by someone who worked for Apple." Headley adds that about three years ago, Steve Jobs traded the serial-numberless board for an Apple II Plus. The errant Apple now rests in the Smithsonian Institution in Washington, D.C.

Who was this mystery student? "Oh, that was Woz," says Randy Wigginton, who, as Apple's first programmer, ought to know. Wigginton has known Steve Wozniak since Woz gave him rides home from the Homebrew Computer Club, "till I was old enough to drive."

Says Wigginton, "That machine at Homestead was a board that didn't pass the original tests when they were trying to design a PC board. Woz fixed the wiring by hand and put spare parts on it, so it doesn't have a serial number or anything. It didn't go out through production."

Wigginton revealed the reason Apple's records on its early machines were sketchy: "There were none.

"When you don't have any money, you don't have a large records department where you write down everything that's going on. We were not looking at it and thinking, 'This is going to be history,' and being very careful about everything. We were saying, 'I hope we make money.' Nobody bothered writing anything down."

Hans Arenz received his Apple II, serial number 000001, out of the back of a pickup truck.

Wigginton would have had one of the first Apple I computers himself, but he says that when he tried to build it, he never got it to work. "But that was my first-ever electronics project."

We contacted the person who seemed most likely to know the whereabouts of early Apples, at the office of his new company in Los Gatos, California. A cacaphony of voices surrounded Steve Wozniak as he recalled the disposition of the original Apple machines: "Well, the first run of IIs went to the Homebrew Computer Club. One of the first of that group went to Randy Wigginton, and others of those went to Homebrew members. The first official orders from a demo went as PC boards to engineers at Hughes Corporation in Los Angeles. The II didn't have a strong presence in the first orders, though."

As for the Apple I, he said, "The first Apple I is the board I have. The second, Randy Wigginton had. The rest of the first few were raw PC boards I was trying out." One board may have gone to a man back East who planned to develop a music card for the Apple.

The best story of all comes from the ex-owner of the very first mass-marketed Apple II. Hans Arenz, who was 14 years old at the time, received his Apple II, serial number 000001, out of the back of a pickup truck parked at a cloverleaf near Silicon Valley.

"My father and godfather worked

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together on getting me a computer for my birthday," says Arenz. They saw a demo of the II and were sold on it when they saw a color graphic of a car rotate on the monitor's screen.

Before Arenz's birthday, his godfather, Alfred Aya, contacted Chet Harris, who worked at Apple, to find out when the machines would arrive. Harris said they had the boards, but not the plastic casings, which were being shipped by air.

The casings appeared in time, but when Aya made an appointment to meet Harris at the Cupertino factory, Harris didn't show up. Harris called later, and the two arranged to meet—at the east side of the cloverleaf at Sand Hill Road near Menlo Park.

When Aya arrived at the cloverleaf, Harris was there in his pickup with Apple II serial numbers 000001 *and* 000002. Harris insisted on giving Arenz number 1, because "it'll be worth a lot of money someday."

Arenz duly received the Apple II, although his father and godfather wouldn't let him at the contraption until he'd mastered a hand-held programmable calculator. After they broke out the II and tried to hook it up to a TV, they discovered that Apple had overlooked the RF modulator. Rather than delay their enjoyment of the computer for more than a few hours, they called a local aviation company, which flew a hand-built modulator from the Apple factory to Arenz's home near Monterey, California!

Arenz, by the way, says the computer changed his life's direction. He had originally planned to be a doctor, but now, as a 20-year-old computer-engineering major at Portland State University, he aims for a career in medical technology, using computers as diagnostic aids.

The Challenge

That's it for our stories—how about yours? We're looking for the owners of Apple II (and I) computers with early serial numbers. We're going to start with the numbers under 100, and to reward those who help us find those first hundred Apples, we'll give you a free year's subscription to *A+*or a year's renewal. For those of you who own the Apples we turn up, we've prepared an *A+* certificate that recognizes you as a pioneer in the world of personal computers. +

Vanessa Schnatmeier is a free-lance writer whose chief interests are women's issues and computer marketing.

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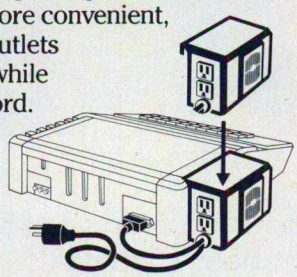

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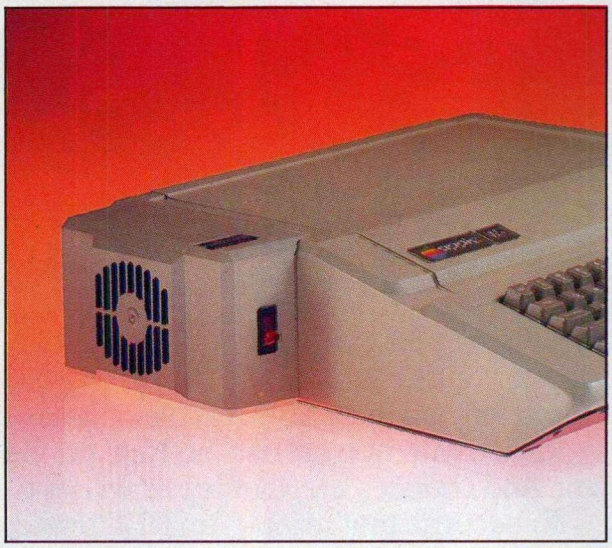

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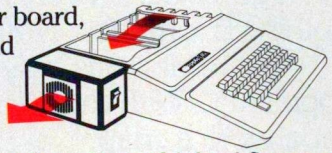

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CIRCLE 134 ON READER SERVICE CARD

The third part of a four-part tutorial on using the language of the LaserWriter printer

Text Presentation with POSTSCRIPT

Working with text is naturally one of the strong suits of the PostScript language built into every Apple LaserWriter printer. In this third part of the *A+* series on working with PostScript, we'll take a look at how this powerful page-description language handles text presentation.

As usual, if you have access to a LaserWriter you can try out the examples using an Apple II, Macintosh, or any other computer with a serial port—and if you don't want to get involved, note again that most application programs automatically take care of all the details of working with PostScript.

To PostScript, text is, on the one hand, a special class of the more general category of graphics shapes, and, on the other, a set of special codes. Thus, all the graphics commands that apply to other shapes in PostScript also apply to text. In addition, text presentation has some special commands and procedures of its own.

Remember that PostScript is a stack-oriented language. Operations get their inputs from this variable-length list of values, and results or other items not immediately needed are pushed back onto the stack until popped back off. PostScript actually has four stacks, but the one we're most concerned with is the operand stack.

PostScript uses the post-fix form of notation, with the input values expressed first, followed by the operation that acts on them.

```
34 add
```

rather than

```
add 3 and 4 or 3 + 4
```

Programs don't need a special overall format, but lines starting with a percent sign (%) are treated as comments.

In the first two articles, we saw how producing a printed line on the page entails picking a font, making it the right size, establishing a position on the page, specifying the string to be printed, and then telling the LaserWriter to output the page. Our simple program was:

```
% pick a font
/Times-Roman findfont
% scale it to 12 point
% set it as the current font
12 scalefont setfont
% move over 1 inch, up about 5
72 396 moveto
% image the text at that point
(this page intentionally) show
(not left blank) show
% print out the page
showpage
```

Working with text is naturally one of the strong suits of the PostScript language built into every Apple LaserWriter printer.

Now, let's look at some of the more special ways PostScript can handle text.

We'll start by making a family of related typefaces from the ordinary Times-Roman font included in the LaserWriter. Typeface designers would probably say that the results of these digital transformations are not nearly as good as a specifically designed form of the letters, but they'll do for most everyday purposes.

First, we make a copy of the Times-Roman font, calling it Ourfont. Remembering that operators and commands get their values from the stack, we have

```
% put a name on the stack
/Ourfont
% tell PostScript to retrieve a
% copy of
% Times-Roman and put it on the
% operand stack too
/Times-Roman findfont
% define that copy as Ourfont
def
```

We're now ready to start making variations. We'll use makefont, which both scales and slants a font using a six-element ordered group of numbers called a matrix. We'll mostly skip over the mechanics of matrix multiplication here (see "Matrices in Space" sidebar). Instead, we'll follow some simple plug-

in formulas for using makefont matrices. For a start, let's make a version of Ourfont that's much taller than normal (or much narrower for its height, depending on how you think of it). To scale a font, we plug in the scale factor in the x (horizontal) direction as the first value, the scale factor in the y (vertical) direction as the fourth value, and leave the others as zero.

Our code thus becomes

```
% define Ourfont as a copy of
% Times-Roman
/Ourfont/Times-Roman findfont
def
% put a copy on the stack,
% followed by the matrix, then
% create the new font
Ourfont [12 0 0 36 0 0 ]makefont
% make that new font the current
% font
setfont
% move to position on the page,
% write
2 16 432 moveto
(Tall fonts and) show
% wait to print until the next
% part
```

In addition to making the font larger or smaller, we can also slant the letters. Again, we use makefont, but this time the matrix is more complex. To get a slant to the right, for example, we want the top of the letter to sit further over to the right than the bottom of the letter does, with the horizontal skew proportional to vertical distance (halfway up, the letter should be displaced half as far over as at the top, and so on). The mathematical function that gives that proportionality factor for x as a function of y and the specified angle, is the tangent. To slant a letter, we put the tangent, multiplied by the horizontal-scale factor, in the matrix's third position.

We have one small additional complicating factor: PostScript doesn't have the tangent function built-in, but instead expects us to find it by dividing the sine by the cosine. Continuing on with our example, we

```
% put a copy of the font on the
% stack
Ourfont
% follow it with our matrix
% with the third position filled
% with the sine of 30 degrees
% divided by the cosine of 30
% degrees, multiplied by 24
% points
[24 0 30 sin 30 cos div 24
mul 24 0 0 ]
% create the new font, set it as
% current
makefont setfont
% continue imaging text at our
% current position
(slanted fonts) show
% print the page
showpage
```

The results should look like this:

Tall fonts and *slanted fonts*

Next, we'll see how we can get PostScript to make text fit into a specified space. We might need to do that, for example, to create justified columns in a report or to label a chart.

The basic strategy is to measure the length of a text phrase, then subtract the length from the intended measure. We'll follow that by dividing the remaining distance among the spaces in the line, which we'll then add to the image. Because we want to use several values more than once, but PostScript operations take parameters from the top of the stack, we'll have to use several exchange operations to reorder the pending values on the stack.

```
% save the environment
gsave
% set up a 12-point font
/Times-Roman findfont
12 scalefont setfont
% move in 4 inches, up 8
288 572 moveto
% put two copies of the string on
% the stack
(All the news that fits in print)
dup
% make another copy, use it to
% count length, which uses up
% the copy and leaves the length
dup stringwidth
% get rid of change in vertical
% position because we just want
% an even horizontal edge
pop
% exchange the length and the
% extra copy of the string
% we left on the stack with the
% first "dup"
exch
% now, we need to set up the stack
% to count the spaces in a line.
% First, we put a zero on the
% stack for a counter
0
% pull the string up above the 0
% on the stack
exch
```


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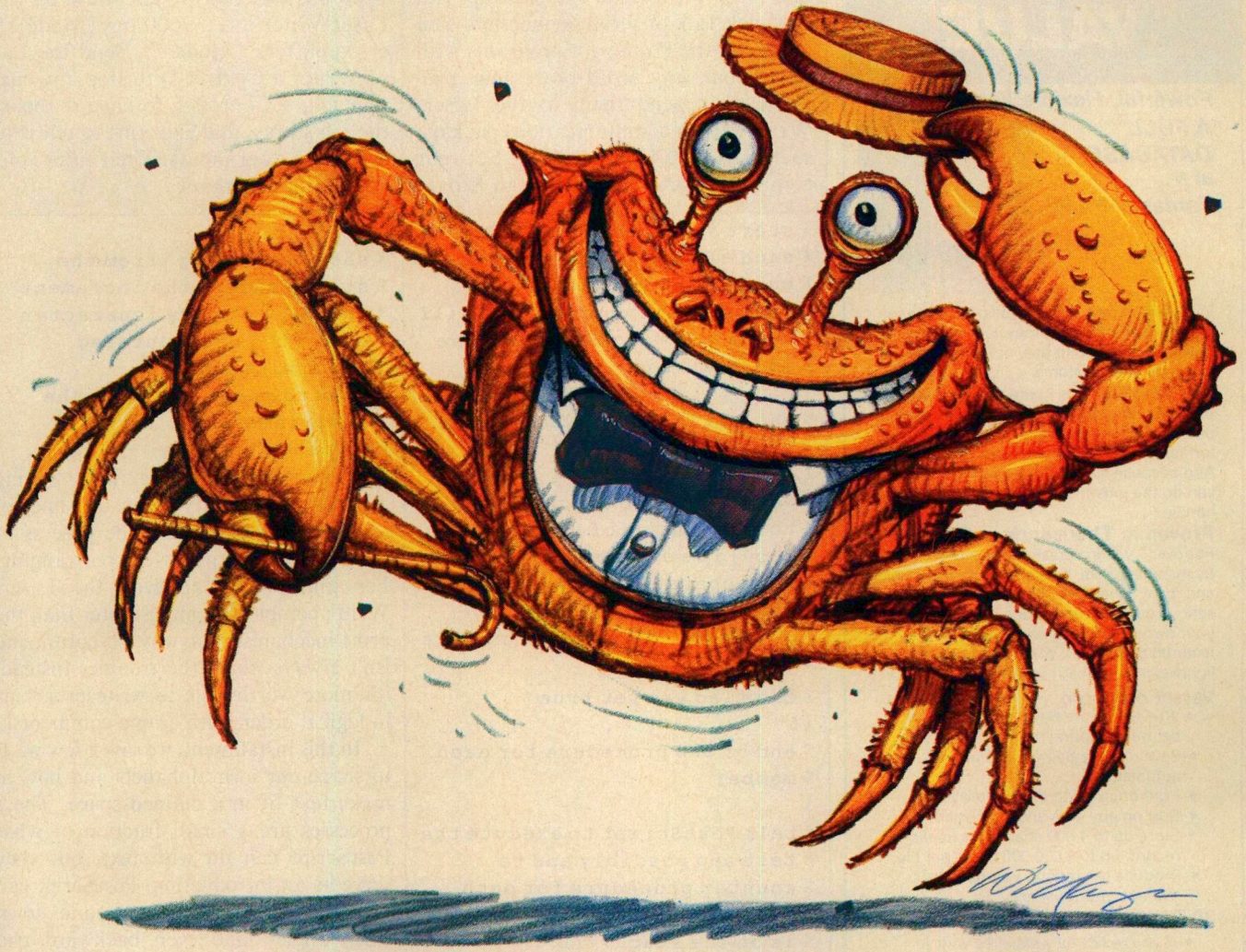

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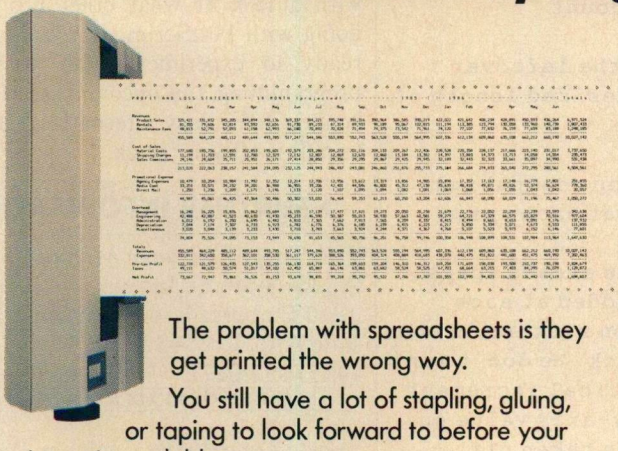

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▸ WRITING YOUR OWN POSTSCRIPT PROGRAMS

If you'd like to try your hand at PostScript programming, you'll need access to a LaserWriter that's hooked up with an AppleTalk or serial connection. You can write the PostScript programs with just about any word-processing program, then send them to the LaserWriter with a communications package such as Access II or MacTEP. Set your communications parameters to 8 data bits, 1 stop bit, no parity, and the X-ON/X-OFF protocol. You can use 1200 bps (set the Mode control on the LaserWriter to 1), 9600 bps (Mode 2), or AppleTalk (Mode 3). Send the LaserWriter a Control-D to stop any current job, a Control-T to have it report the job status, and Execute to tell it to echo back your inputs. Then enter your PostScript programs.

```
% start a procedure to do for
% each element of the string,
% but mark it for deferred
% execution; the procedure will
% count how many spaces we have
% in the string
{
% set a flag if the element is a
% space (code 32)
32 eq
% leave a procedure on the stack
% to add 1 to top of stack, which
% should be our counter when
% this operation is executed
{1 add}
% do the add to counter procedure
% if
% the flag was set true
if
% end of the procedure for each
% member
}
% tell PostScript to execute the
% test and possibly add to
% counter procedure for each
% element of the string (which
% is on the stack)
forall
% now exchange so the length is
% on top of the count
exch
% now subtract the leftover
% space from a desired length of
% 4 inches (72 × 4)
288 exch sub
% do the division, computing
% length to add at each space
exch div
% we now have the excess space
% that must be added at each
% space position sitting on the
% top of the stack. We don't want
% any extra vertical increment
% but we need a y-axis value on
% the stack to be taken off
% by widthshow
0
% widthshow needs the string at
% the top of the stack, and it's
% now 3 down so pull the third
% element to the top and roll all
% the others down
3 -1 roll
% show the string (from the
% stack) adding the increment
% whenever a space (character
% code 32) is encountered
32 exch widthshow
% show the page, restore the
% environment
showpage grestore
```

Of course, if we were actually writing a program to justify (even up) lines of text, we might optimize the process so the stack would need less rearranging. For simple text, however, the LaserWriter computer is much faster than the print mechanism anyway, so optimizing isn't always worth the trouble. Instead, it's more worthwhile to write programs in logical order, with ample comments.

In this installment, we saw a few ways to shape our own alphabets and how to make text fit in a defined space. These processes are a small fraction of what PostScript can do with text, but they serve as an introduction. PostScript can literally write in circles, up and down steep angles, and even backward and forward.

Next month, we'll conclude this series with a look at what other people are doing with PostScript. If you don't feel ready to experiment with your own programming, this upcoming section will contain some easy alternatives. Be sure to pull it off your stack. ✚

▸ FURTHER INFORMATION

PostScript Language Manual ($30)
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▶ MATRICES IN SPACE

PostScript keeps track of shapes and points as grid locations, but the grid may be different for the individual characters, for the page description, and for the ouput device. We can also set up temporary grids with new origins (0,0 position) or at an angle to the existing lines. Many of the PostScript operators are concerned with making a transformation from one grid to another.

One effective way to go between grids is by using matrix multiplication. PostScript makes extensive use of these multipliers, from mapping the character space into the user space, to mapping the user space onto the output device itself. As with many of the details of PostScript, you can start off without worrying at all about matrix mathematics and let PostScript automatically calculate the essential values. If you're curious or ready for more advanced operations, however, here's how graphic matrices work.

Starting with any point value in two dimensions, we extend that (X, Y) pair to triplet matrix of [x y 1]. We can then accomplish the three basic graphics transformations by multiplying by the appropriate three-by-three matrix. For those of you who haven't learned matrix multiplication or have forgotten it along the way, multiplying the matrix

$$\begin{bmatrix} A & B & 0 \\ C & D & 0 \\ E & F & 1 \end{bmatrix}$$ by [X Y 1]

yields a new three-element matrix with
first term = (X*A)+(Y*C)+(1*E)
second term = (X*B)+(Y*D)+(1*F)
third term = (1*0)+(1*0)+(1*1).

To translate (move position sideways), we set the the matrix to

$$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ dx & dy & 1 \end{bmatrix}$$

which multiplied by [X Y 1] yields

$$\begin{aligned} &[(X*1)+(Y*0)+(1*dx) \\ &(X*0)\ +(Y*1)+(1*dy) \\ &(1*0)\ +(1*0)\ +(1*1)], \end{aligned}$$

simplifying to

$$\begin{aligned} X' &= X+dx, \\ Y' &= Y+dy, \\ 1 &= 1. \end{aligned}$$

To scale (move up or down in size), the matrix becomes

$$\begin{bmatrix} Sx & 0 & 0 \\ 0 & Sy & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

which multiplied by [X Y 1] yields

$$\begin{aligned} &[(X*Sx)+(Y*0)\ +(1*0) \\ &(X*0)\ +(Y*Sy)+(1*0) \\ &(1*0)\ +(1*0)\ +(1*1)], \end{aligned}$$

simplifying to

$$\begin{aligned} X' &= X*Sx, \\ Y' &= Y+Sy, \\ 1 &= 1. \end{aligned}$$

Finally, to rotate the axes at an angle, the matrix is

$$\begin{bmatrix} \cos(a) & -\sin(a) & 0 \\ \sin(a) & \cos(a) & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

which multiplied by [X Y 1] yields

$$\begin{aligned} &[(X*\cos(a))+(Y*\sin(a)\ +(1*0) \\ &(X*-\sin(a))+(Y*\cos(a))+(1*0) \\ &(1*0)\ +(1*0)\ +(1*1)], \end{aligned}$$

simplifying to

$$\begin{aligned} X' &= X*\cos(a)\ +y*\sin(a) \\ Y' &= X*-\sin(a)+Y*\cos(a) \\ 1 &= 1 \end{aligned}$$

Although these matrix operations seem tedious by hand, they're reasonably easy for a computer. More complex transformations can be constructed using combinations of displacement, scale, and rotation in the proper sequence.

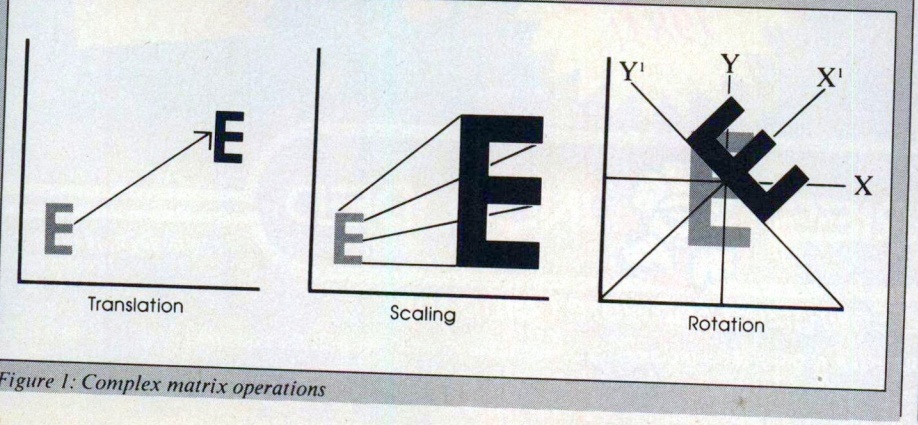

Figure 1: Complex matrix operations

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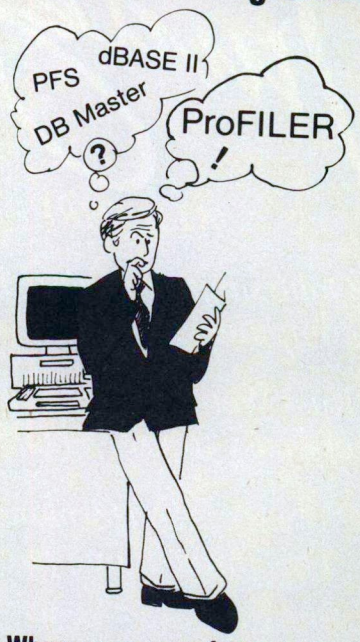

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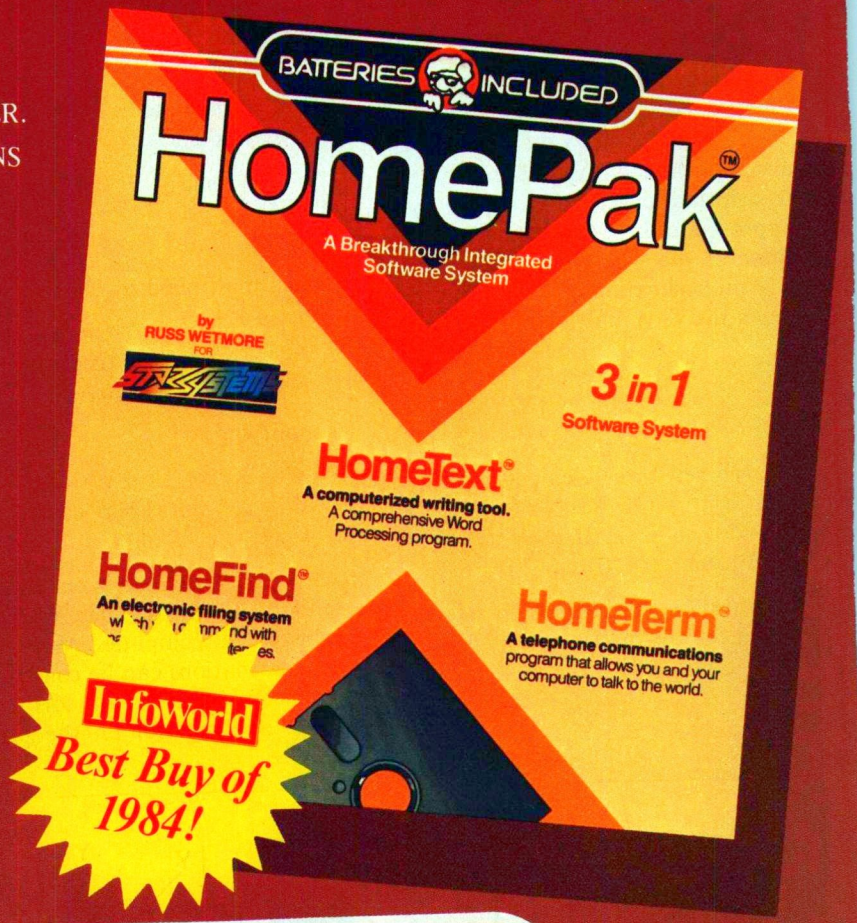

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UNDERSTANDING ProDOS

PART FOUR OF A FIVE-PART TUTORIAL ON THIS NEW OPERATING SYSTEM PROGRAM FOR THE APPLE II FAMILY. THIS MONTH WE TAKE A CLOSE LOOK AT FILER, A UTILITY PROGRAM ON THE ProDOS USER'S DISK THAT YOU CAN USE TO PERFORM MANY FILE- AND DISK-HANDLING CHORES, SUCH AS FORMATTING OR COPYING ENTIRE DISKS OR TRANSFERRING FILES FROM ONE DISK TO ANOTHER.

In previous articles in this series, I have introduced you to ProDOS directories, prefixes, pathnames, and all the Applesoft disk commands defined in a system program called BASIC.SYSTEM. This month we're going to take a close look at a utility program on the ProDOS User's Disk that you can use to perform many convenient file- and disk-handling chores, most of which the simple BASIC.SYSTEM commands cannot handle. This program is called FILER.

FILER's most common use is to format or copy entire disks or to transfer a file, or a group of files, from one disk to another. Users of DOS 3.3 will recognize FILER as the ProDOS equivalent of FID.

You start FILER up by booting the ProDOS User's Disk and entering the command -FILER from the Applesoft Direct mode.

When FILER begins, you will see a menu of five items:

? - TUTOR
F - FILE COMMANDS
V - VOLUME COMMANDS
D - CONFIGURATION DEFAULTS
Q - QUIT

To make a selection, just press the character that appears to the left of the menu item.

Three of the entries in FILER's opening menu are straightforward, and I won't discuss them here at length. TUTOR displays two pages of introductory information for new users of the program. The CONFIGURATION DEFAULTS entry simply allows you to set the default disk slot and drive numbers for use when you invoke volume commands.

You can also specify that output is to go to the monitor only or to the monitor and a printer. Note, however, that enabling the printer does not cause the output of all commands to print; I'll point out the commands that are affected as I discuss them.

QUIT lets you exit from FILER and transfer control to another ProDOS system program; it works just like the BASIC.SYSTEM BYE command. That is, after you enter it, you will get a message to enter the prefix and pathname of the next system program to be used.

The remaining two entries, FILE COMMANDS and VOLUME COMMANDS, represent the bulk of FILER. Let's begin our detailed look at them with the volume commands and then move on to the file commands.

The Volume Commands

When you press V to select VOLUME COMMANDS from FILER's initial menu, you will see a list of eight commands in another menu, one of which is a TUTOR command similar to the one mentioned above. Before we get to the other seven commands, let's lay down some of the ground rules that you must follow when you're in this part of FILER.

Most of the volume commands ask you to enter the slot number and drive number of the disk that is to be acted on. The slot number refers to the number of the connector at the back of the Apple II in which the controller card for the disk drive has been installed. If you are using a Disk II drive, this number is probably 6. The drive number is either 1 or 2, depending on whether the drive cable is connected to the upper (1) or lower (2) connector on the controller card.

You will also have to enter a volume directory name when you use some of the volume commands. As we saw in June, the rules for entering such a name are the same as those for standard ProDOS files: The name can be up to 15 characters long and must begin with an alphabetic character; the other characters can be alphabetic characters, digits, or periods. None of the volume commands allow you to enter illegal characters in a volume name; instead, you will hear a beep, and the character will be ignored.

If you make a mistake when typing in a volume name, you can use the left-arrow key to move the cursor to the erroneous character and then type over it. Once you've entered the name properly, press Return. Note that FILER ignores all characters appearing at or after the cursor position when you press Return; to include them, move over them with the right-arrow key before pressing Return.

Now let's take a look at each of the volume commands in the order in which they appear in the VOLUME COMMANDS menu.

FORMAT A VOLUME

Before you can use a disk with ProDOS, you must properly format it, a process that involves laying out templates for each data block and for set-

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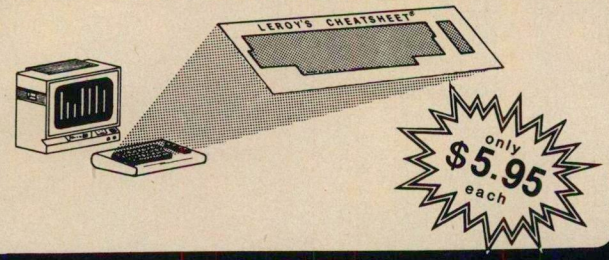

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ting up a blank disk directory and volume bit map. (ProDOS uses the volume bit map to keep track of block usage on the disk.) Some application programs, such as AppleWorks, allow you to format disks from within the program; most, however, rely on you to format disks yourself with FILER.

Formatting a disk volume is easy. You simply enter the slot and drive number for the disk and then a volume name. Specifying a volume name can be quite painless if you accept the displayed default name of the form /BLANKxx (where *xx* is a two-digit number) by just pressing Return.

If the disk you are about to format has already been formatted, you will see the warning message

```
DESTROY "/DISK.NAME"?(Y/N)
```

You get this message because the formatting process permanently erases any data already stored on the disk. If you really don't want to destroy all that data, you can cancel the operation by pressing N (or the Escape key). Otherwise, proceed by pressing Y.

The formatting procedure takes about 15 seconds. When it finishes, the message FORMAT COMPLETE appears, and the disk is then ready for use with ProDOS.

COPY A VOLUME

This command lets you make a duplicate copy of a disk. When you enter the command, you receive a request to enter the slot and drive numbers of the "from" (source) disk and the "to" (destination) disk. (If you have a one-drive system, enter the same number for both the source and the destination. FILER will tell you when to remove one disk and insert the other during the copying process.) Next you insert the disks and press Return. After that, you are asked to specify a volume name for the destination disk—the name of the source disk appears as a default, however, and you can accept it by pressing Return.

Before the copying process begins, FILER formats the destination disk, just as if you had entered the FORMAT A VOLUME command. Thus, if the destination disk is already formatted, FILER will ask you to verify that the volume is to be destroyed, before formatting begins.

After the formatting of the destination disk, the COPY A VOLUME command transfers the contents of the source disk to the destination disk by alternately reading from the source disk and writing to the destination disk—a total of nine passes is necessary to complete the copy. (Copying is a tedious procedure if you have a one-drive system, because you must swap disks after each pass.)

When the copying process ends successfully, you get a COPY COMPLETE message.

LIST VOLUMES

This command displays the slot and drive numbers and the volume name of the medium for each ProDOS disk device installed in the Apple II. For example, if you have a two-drive Apple IIe with an Extended 80-Column Card installed, the LIST VOLUMES command will display information in the following format (it will also send it to the printer if you have issued the CONFIGURATION DEFAULTS command):

```
SLOT        DRIVE       VOLUME

 6           1          /APPLEWORKS
 6           2          /DATA.DISK
 3           2          /RAM
```

The slot 3, drive 2 volume called /RAM uses the 64K of

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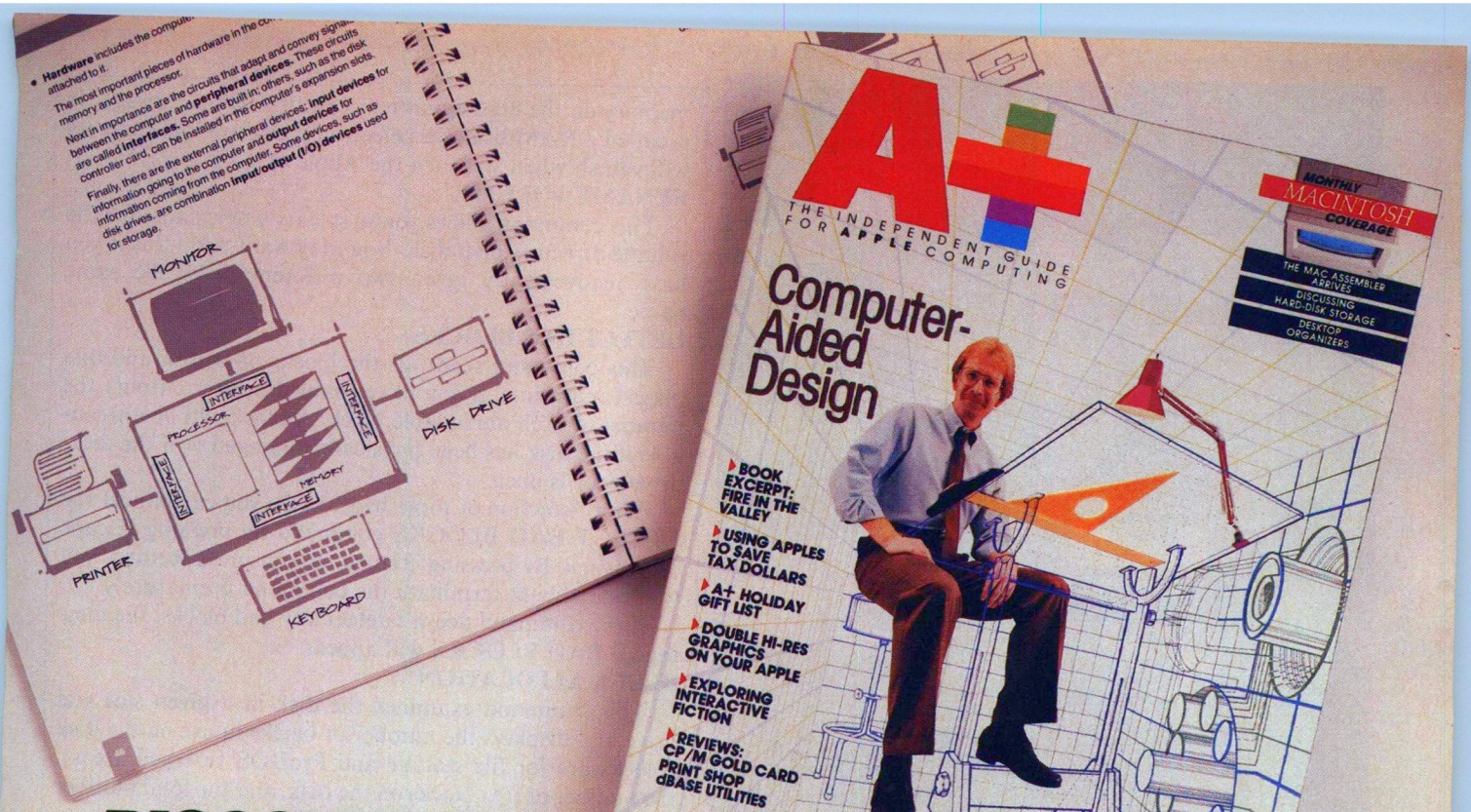

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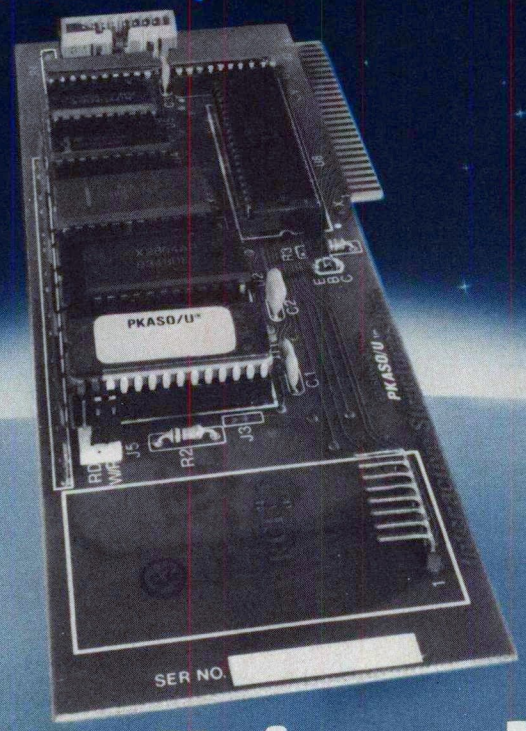

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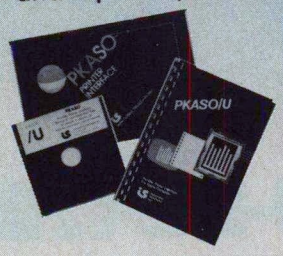

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memory on the 80-column text card for "disk" storage. It is called a RAMdisk or an electronic disk, and its contents will vanish when you turn the Apple off.

RENAME VOLUME

This command allows you to specify a new name for the volume directory on a disk. You may want to do this if you have inadvertently given two different disks the same name.

DETECT BAD BLOCKS

This command scans all the blocks on a disk and displays (and prints, if you have enabled printer output) the number of each unreadable block. A block will be unreadable if the disk has been physically damaged or if the disk-drive door is open.

After detection of three bad blocks, you can cancel the DETECT BAD BLOCKS command by pressing Escape or continue by pressing Return. If you press Return, you won't be able to terminate the command prematurely.

If the command doesn't detect any bad blocks, the message 0 BAD BLOCKS will appear.

BLOCK ALLOCATION

This command examines the disk in a given slot and drive and displays the number of blocks in use on the disk (blocks are for file storage and ProDOS reserved areas), the number of free blocks on the disk, and the total number of blocks on the disk.

For example, if 98 blocks are in use on a standard 5¼-inch floppy disk, the BLOCK ALLOCATION command will display the following results:

```
98 BLOCKS USED
182 BLOCKS FREE
280 BLOCKS TOTAL
```

Note that you get a display of this same information, in a slightly different format, when you use the BASIC.SYSTEM CATALOG command to list the disk directory.

COMPARE VOLUMES

If you're prudent, you are probably used to making backup copies of your program and data disks so that if your original is damaged, you can recover quickly.

You should make a new backup copy of an original disk shortly after you change the data on the original in any way. If you can't remember whether you've made any changes since the last backup, the COMPARE VOLUMES command should come in handy.

COMPARE VOLUMES does a block-for-block comparison of two disks and displays (and prints, if the printer is enabled) the numbers of any blocks that are different. After detection of three discrepancies, you can cancel the command by pressing Escape or continue by pressing Return. If you continue, you can't interrupt the comparison operation until all the blocks have been checked.

If the disks are identical, the message COMPARE COMPLETE will be displayed.

THE FILE COMMANDS

The file commands let you easily perform several useful maintenance operations on files: copying, deleting, renaming, locking, and so on. You can also control many of these operations by using the BASIC.SYSTEM commands that we looked at in June and July.

The main advantage of using FILER instead, however, is that you can have *groups of files* acted on at the same time by specifying filenames that include one of two wildcard characters: ? or =. When FILER encounters a name

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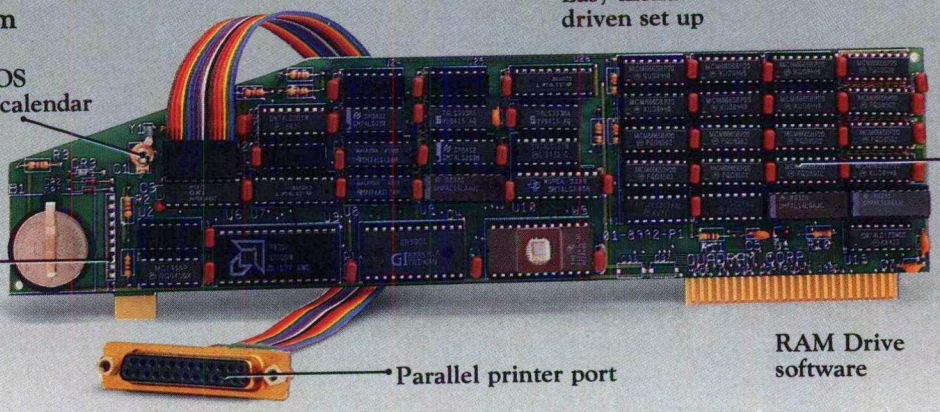

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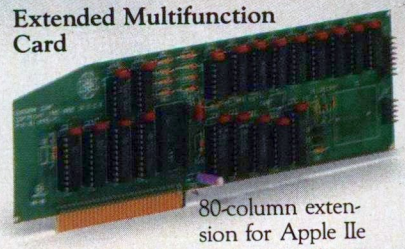

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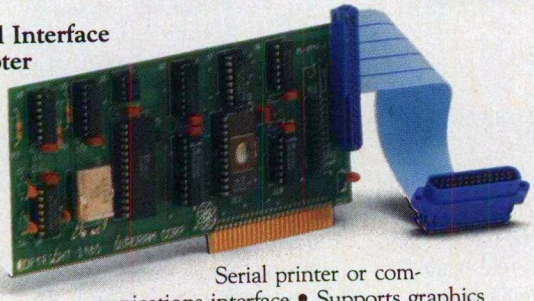

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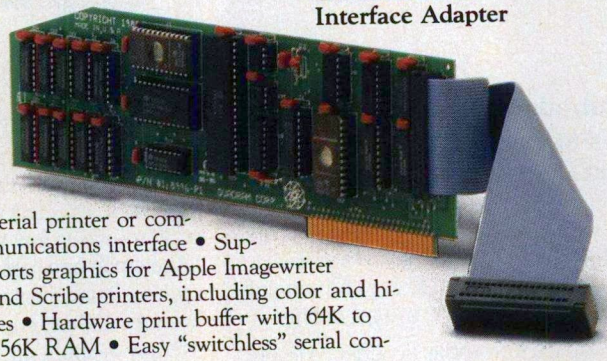

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with a wild-card character, all files whose names begin with the character(s) before the wild card and end with the character(s) after it will be dealt with together.

For example, if you specify the name B?D or B=D, FILER will act on files with the name BAD or BEDAZZLED or any other file whose name begins with B and ends with D. If you specify just ? or = as the filename, *all* files will be selected.

The one major difference between the two wild-card characters is that if you use ?, the message

```
FOR EACH FILE, ENTER (Y/N) OR < ESC >
```

appears when the command starts to run. Then, when FILER finds a matching filename, it displays it, and you have to press Y to confirm that the file operation is to be performed on that file or N if it isn't. On the other hand, if you use =, FILER deals with all matching files without prompting you.

In contrast to the situation with volume commands, you cannot specify disk volumes by slot and drive numbers when you use the file commands. You have to use prefixes and pathnames instead.

Let's look at each of the eight main file commands now (we'll ignore the self-explanatory TUTOR command).

LIST PRODOS DIRECTORY

You use this command to display a list of the names of all the files stored in the specified disk directory. Just enter the = wild card instead of a specific filename. (Note that you cannot mix this wild card with other characters.)

The format for displaying each file entry looks something like this:

```
BASIC.SYSTEM SYS 21 18-JUN-84
```

where the number after the filename and the file-type mnemonic shows the size of the file (in blocks) and the date is the date of the last file modification. This format is the same one the BASIC.SYSTEM CAT command uses.

The ProDOS directory listing will also go to the printer if you have enabled printer output with the CONFIGURATION DEFAULTS command in FILER's opening menu.

COPY FILES

This command is for transferring a file or—with wild cards—a group of files from one disk to another. For example, to transfer all files whose names end in .AW from the /WORDPRO disk volume to the /BACKUP volume, specify that the transfer is from /WORDPRO/=.AW and that it is moving to /BACKUP/=.AW. If you want a prompt to confirm the transfer of each matching file before it occurs, use the ? wild card instead of =.

If the destination disk already has a file with the same name as the one you're copying, you will see the message

```
DELETE EXISTING FILE?(Y/N)
```

If you want to overwrite the existing file, just answer by pressing Y. If you press N instead, the file will not copy.

DELETE FILES

This command works just like the BASIC.SYSTEM DELETE command, except that you can specify wild-card filenames as well. For example, to delete all files in the prefix directory, with prompting, specify ? as the filename.

COMPARE FILES

This command is for doing a block-for-block comparison of two files to see if they are the same. If they are not, you'll get the message FILES DO NOT MATCH. You

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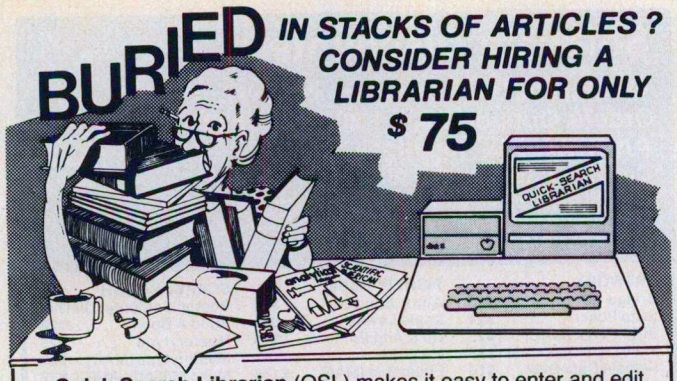

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cannot use wild-card filenames with the COMPARE FILES command.

ALTER WRITE PROTECTION

This command either locks or unlocks a file or a group of files. You may recall from the June article that locked files are protected in that no one alter or delete them unless they first unlock them. You can label them with an asterisk that appears to the left of the filename when you list the directory with the BASIC.SYSTEM CATALOG command.

After you enter the filename, FILER asks you

```
LOCK FILES?(Y/N)
```

If you press Y, the file will be locked; if you press N, it will be unlocked.

RENAME FILES

This command lets you change the name of any file. The only restriction is that the new name must refer to a file in the same directory as the original.

MAKE DIRECTORY

This command is for creating a new subdirectory on a ProDOS disk, and it works much like the BASIC.SYSTEM CREATE command. The file-type mnemonic for the resultant directory file is DIR.

If you're prudent, you are probably used to making backup copies. You should make a new backup copy of an original disk shortly after you change the data on the original in any way.

SET PREFIX

This command allows you to enter a pathname prefix—a series of directory names separated by slashes—that the other file commands will use. FILER automatically appends to the current prefix any filename or partial pathname that you specify when using a file command, in order to create the full pathname that ProDOS requires.

If the prefix that you provide is not preceded by a slash, FILER creates a prefix by appending the newly specified prefix to the current prefix. The currently active prefix always shows at the top of the screen when you enter a file command.

The effect of the SET PREFIX command is the same as that of the BASIC.SYSTEM PREFIX command.

Preview

Next month will be the grand finale. We will discuss the CONVERT program, which you can use to transfer programs and files between DOS 3.3- and ProDOS-formatted disks. Then, we'll finish up with an introduction to the MLI (machine-language interface) subroutines, which assembly-language programs can call to perform standard disk operations. +

Gary B. Little is a writer from Vancouver, British Columbia. His latest book is a detailed study of the internal structure of ProDOS: Apple ProDOS, Advanced Features for Programmers *(1985, Brady Communications). He is also the author of the Modem Magician telecommunications program.*

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1598	THE FACTORY (HOME)	44.95	31.70
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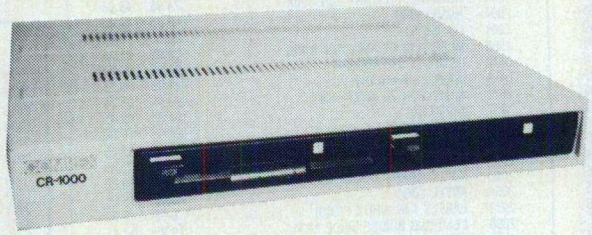

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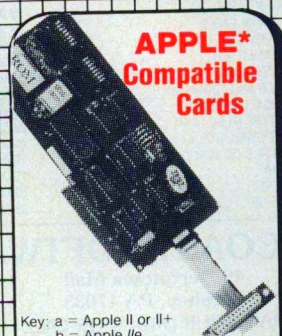

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CIRCLE 279 ON READER SERVICE CARD

TELECOMMUNICATIONS
BY RUSS LOCKWOOD
Federal news, baudy bedfellows, and BBSs

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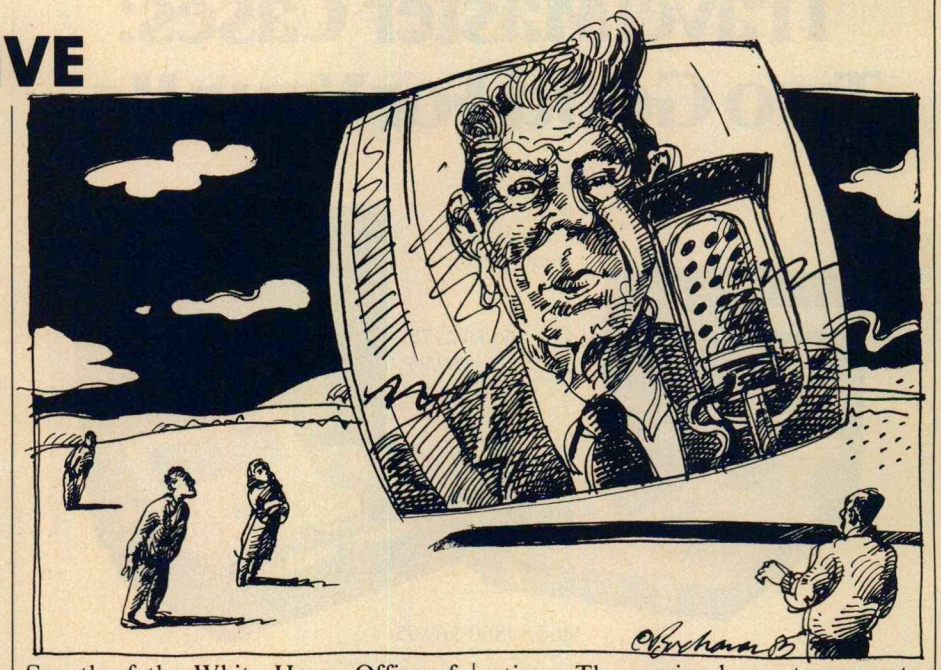

When you want news about the U.S. government, where do you turn? What source do you use to gather up-to-the-minute information about national issues?

You could try nightly network television newscasts. With only 30 minutes of air time and a sizable government, however, you are lucky to see where the president traveled that day, much less find out about the policies and activities of various agencies.

You might try the radio, but five minutes at the top of the hour hardly provides you with much information. The all-news-format stations are better, but, again, they cover only the "top" stories.

Newspapers? You are certainly getting closer. On occasion, national newspapers carry the full text of politicians' speeches. Sometimes, on your truly lucky days, buried at the bottom of a page next to an ad for punk-rock fashions, you find a small tidbit of information that is more important to you than the column inches it occupies, if it is less than a day old.

What is left, you ask. The answer: Telecommunications. ITT, the same corporation that runs the Dialcom electronic-mail network, now offers Fednews—up-to-the-minute U.S. government-inspected and -issued news, available instantly via your Apple and a modem.

Fednews

Fednews grew out of the White House News Service (WHNS), a smaller telecommunications service started in November 1984 to "allow timely distribution of important news to those media which do not have a representative based directly at the White House," according to Merrie Spaeth of the White House Office of Media Relations.

The WHNS transmits official and unedited news releases, statements, the full text of presidential speeches, personnel appointments, announcements of new legislation, and other news from the White House Press Office, the First Lady's Office, the Office of the Vice President, and the Office of Management and Budget. All of the above are currently distributed on paper to reporters and news organizations based in Washington, D.C.

Fednews, available to anyone with an Apple and a modem, enables users to put the *new* back in news.

The big users of the WHNS so far are large corporations and trade associations. The service hopes to generate interest among small newspapers and radio stations that now rely on articles from the Associated Press, United Press International, and other news organizations. Anyone with a modem and computer can tie into the service.

Note that information available through the WHNS is the official line of the administration. Although presidential speeches are easy enough to understand, announcements issued in "governmentese" are often harder to comprehend. (You may remember when the White House struck the word *killing* from its vocabulary in favor of "the unlawful deprivation of life.") Even the WHNS service-agreement contract states, "Application programs and data bases are made available for Customer's assistance and convenience only and not as substitutes for Customer's analysis or judgment."

Some members of the media claim that the service was started because President Reagan has complained re-

YVONNE BUCHANAN

peatedly that reporters often distort his views and misinterpret his words. Although they officially denied it, some White House aides believe that giving the president's views a direct link to newsrooms, boardrooms, and classrooms across the country will give his message a better chance of reaching the people intact.

The WHNS is but one part of Fednews, however. Other U.S. agencies offering electronic versions of their announcements and pronouncements include the Army Reserve, the Department of Agriculture, the Food and Drug Administration, the Department of Labor, the Federal Emergency Management Agency, the Department of the Interior, and the National Aeronautics and Space Administration (NASA). These other services are updated at the discretion of the White House. Although the updates usually occur daily, the releases are stored in the database for only two weeks.

The service uses the ITT E-Pub electronic-publishing software, which allows users to search for information with key words. Thus, if you wanted to know how Senator Garn fared on the space shuttle *Discovery*, you would use the words *Garn* and *Discovery*. The system then retrieves all stories containing those two words.

The cost is very reasonable to small newspapers and television and radio stations. Access is via Tymnet, Telenet, and direct dialing. ITT charges $35 per hour, 24 hours per day. That means no price difference between prime and nonprime use. Fednews carries a $25-per-month minimum.

Unfortunately, these two pricing factors combine to make the cost too steep for all but upscale computer owners. If the rates were on a par with those of CompuServe or The Source, I'd sign up in a flash just for the NASA news.

Nevertheless, the U.S. government is finally realizing the speed and efficiency of telecommunications. Fednews, because it is available to anyone with an Apple and a modem, enables users to put the *new* back in news and receive immediately all the information that is important to them.

TELETIPS

This section deals with news, views, and breakthroughs in the telecommunications world. It offers a quick overview of new features added to services we have already reviewed. I get the information by culling the numerous press releases that streak across my desk each day.

A Quartet of Studies

Link Resources, a research subsidiary of International Data Corporation, predicts electronic-mail services will lure more and more corporations into going on-line. Link estimates that, overall, electronic-mail-services revenue will grow from a mere $80 million in 1983 to more than $2.1 billion in 1988—an annual growth rate of 107%.

Link contends that the fastest-growing group will be mixed-mode services, which offer both terminal-to-terminal and hard-copy courier delivery of messages. Revenue estimates are $22 million in 1984 to $100 million in 1985 to $800 million in 1988. Companies offering this service include MCI Mail, Federal Express ZapMail, and Western Union Easylink.

Electronic Services Unlimited has released a 100-page study called *Telecommuting: Demographics, Profiles, and Projections* that looks at the growing trend in corporate America to encourage some employees to do part of their work at home. The report claims that from 10 to 15 million people will

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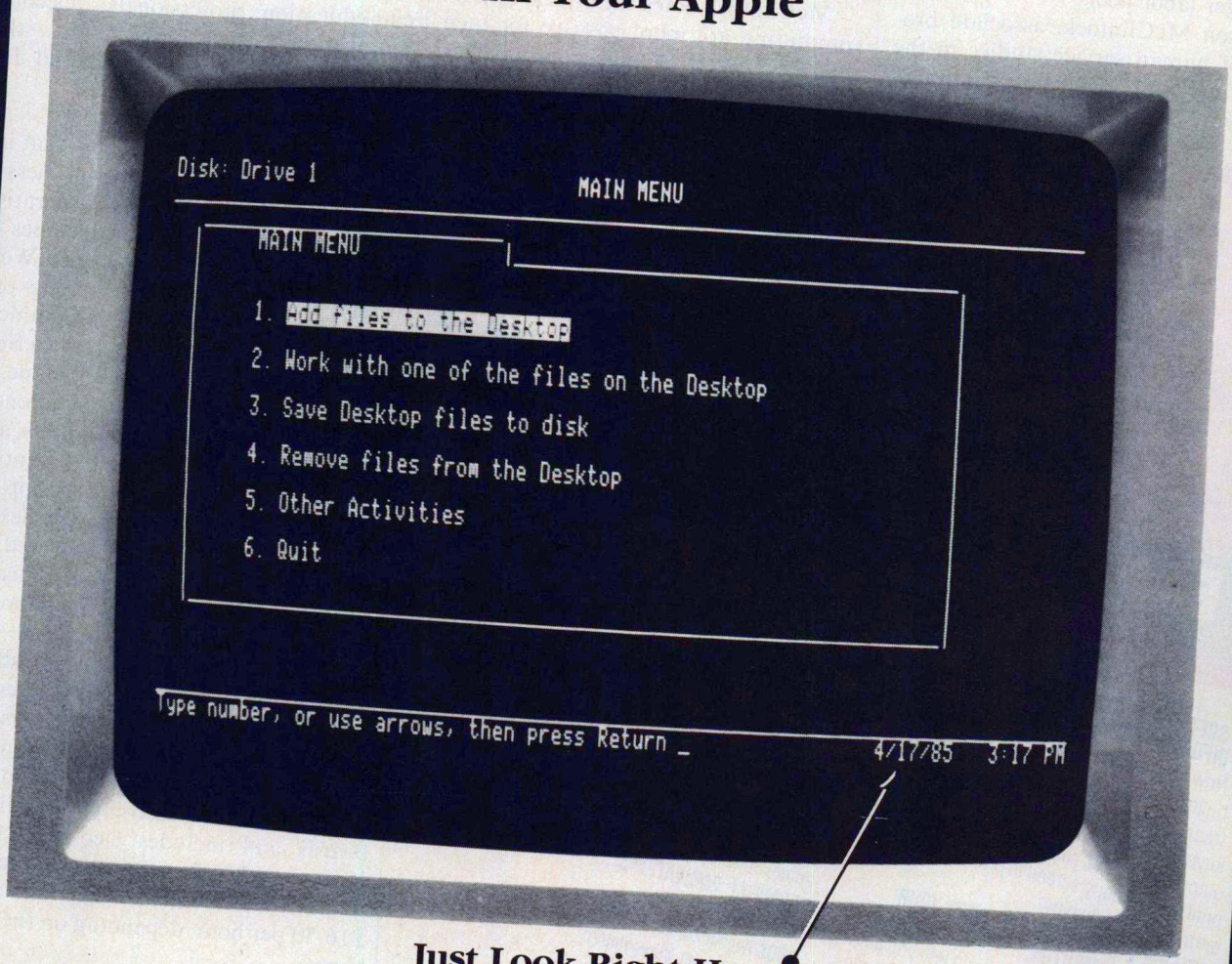

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be telecommuting by 1990.

The study notes that most people telecommute because it gives them flexibility with their schedule. Maternity leave and child care are other reasons. "Teleworkers" tend to put in more time, and corporations report increased productivity, less absenteeism, improved employee retention, and access to a larger labor pool.

Clinton McClintock, associate professor of human service studies in the New York State College of Human Ecology at Cornell University, has released a study on telecommuters. He notes telecommuters tend to be self-employed, highly educated adults who work most often in the morning and on weekday evenings. They tend to put in more working hours than they did before they telecommuted, and they report increased work productivity and quality and greater satisfaction with their jobs.

McClintock notes the effects of telecommuting are more positive for men than for women. Women reported they worked harder, had less leisure time, and engaged in more conflict at home over time and space since they began telecommuting. McClintock notes that supervision for telecommuters must focus on work quality and scheduling requirements rather than on social cues such as punctuality and appearance.

The Oregon School Study Council has published a study on telecommunications and the handicapped. The study examines communication among special-education professionals, telecommunications technology for the handicapped, and programs used for special education in Oregon.

Electronic Libido

Playboy magazine, realizing that interest in the adult publishing business is falling, has branched into the lucrative VCR market with "live" videotapes of interviews and photo sessions. Well, *High Society* magazine is doing one better—entering the telecommunications field with its X-rated service Sextex from its subsidiary CVC Online.

Services include on-line conferences with centerfold models, sex experts, and other subscribers; X-rated adventure games; electronic mail; and a shop-at-home service. A spokesman for Sextex notes the service is "doing real well."

Sextex costs $67.50 for a registration fee and $11 per hour—plain brown wrapper optional.

Xnet has also introduced an adult-electronic-mail service that offers a "computerized version of the personal advertisements you've seen in many magazines and newspapers." It is divided into several special-interest bulletin boards and includes electronic mail. Xnet costs $25 for a registration fee, $5 monthly mailbox fee, and from $7 to $16.50 per hour, depending on the local time.

Humans has introduced CompuDate, a "national computerized single's club" offering "on-line computer matchmaking." Services include questionnaires, electronic mail, bulletin-board ads, on-line newsletter and forum, and personal profiles. A one-year membership costs $39.95, and CompuDate is available on The Source.

Delphi, from General Videotex Corporation, offers Amsex, an interactive electronic newsletter that "serves as a forum for personal, public, and professional sex-related issues."

Bulletin-Board Services

If you cannot wait to use your modem, try calling some of these special-interest bulletin-board services (BBSs).

Roots-BBS caters to genealogists and others interested in searching for

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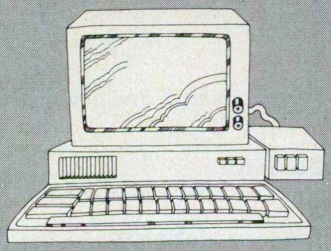

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ancestors and applying computers to such research. Most messages deal with finding the origins of surnames, although hardware and software help and a list of BBSs is also available.

Although anyone can dial up the BBS, you need to get permission from sysop Brian Mavrogeorge to download files and enter conferences. Permission is granted to those actively participating on the BBS.

The Advocate BBS provides information on feeding, housing, health, and general pet care for parakeets, cats, guinea pigs, hamsters, and rabbits. A rather complete section of national and international general news about animals, from such proanimal organizations as the American Fund for Alternatives to Animal Research and the International Primate Protection League, is also available.

Noah's Ark specializes in plant and animal breeding. Information on birds, fish, reptiles, and rare fruits and plants is available, as well as private electronic mail. The BBS also serves as a trading post for animals and plants.

Noah's Ark also has a section about magic (the sleight-of-hand kind). It includes a couple of rudimentary card tricks and a discussion about magic card decks.

Logging Off

Telecommunications offers a wealth of instant information for the business and for the home. The industry is growing, and more and more people are enjoying the benefits of telecommuting for research and leisure. Connecting a modem to your Apple places the world where it should be—at your fingertips. ✚

Russ Lockwood is an assistant editor of Creative Computing *and a former staff writer for The New York Times Information Service.*

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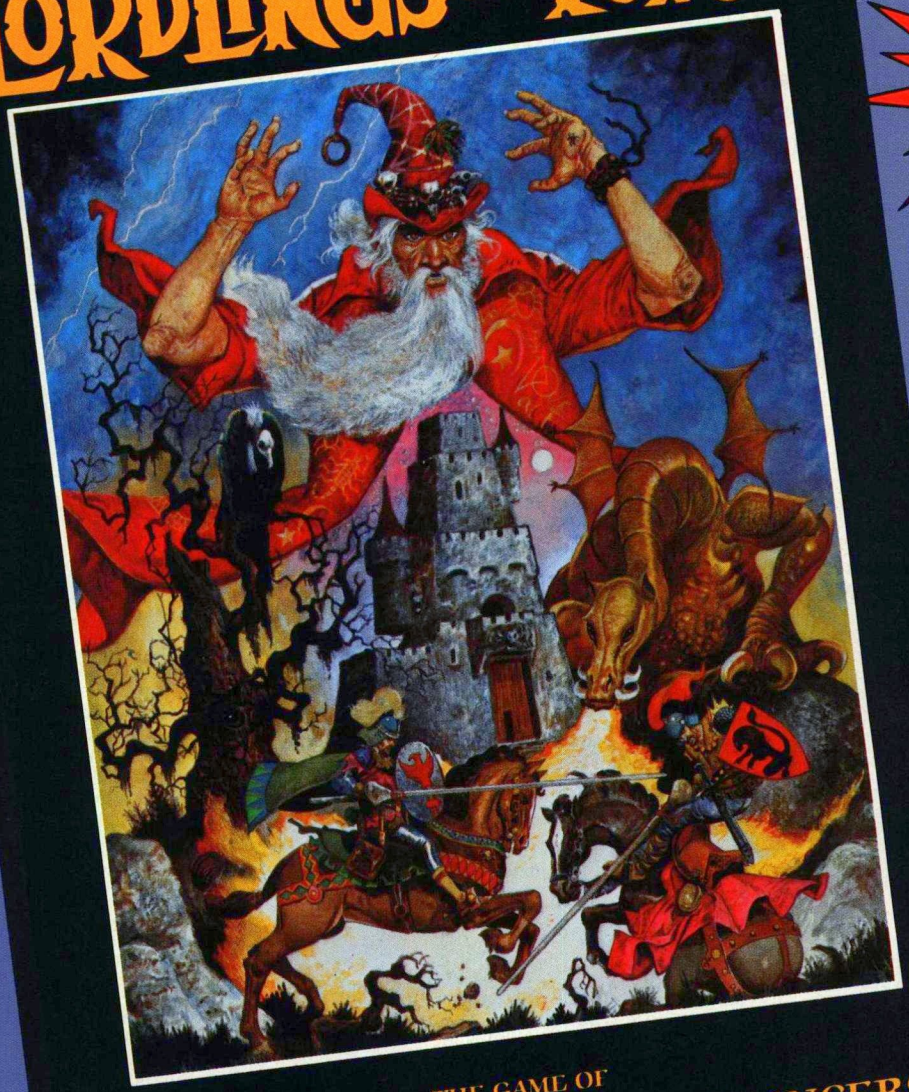

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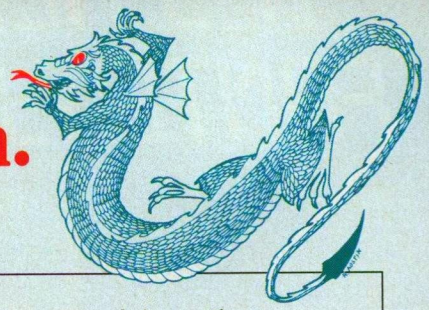

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Wizardry is a complex world of variety and depth. A world of richness and pleasure.

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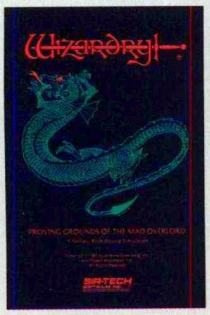

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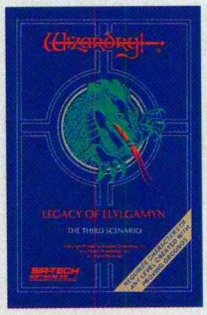

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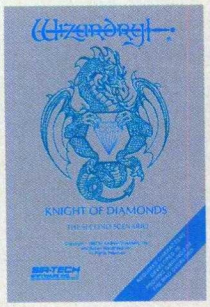

Knight of Diamonds

The Second Scenario

This classic journey should only be attempted with those Wizardry heroes who have attained the 13th level of ability in PROVING GROUNDS. Their challenge—and yours—to adventure through a six-level maze and become the Knight of Diamonds. First-rate fantasy!

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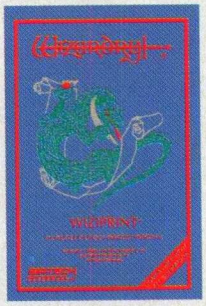

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TYPING INTRIGUE
MACVEGAS
KAMPFGRUPPE
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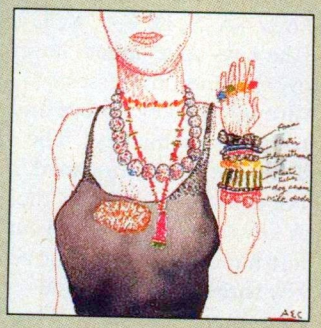


You've just been framed. You have only a few hours to figure out who the real murderer is before they come to take you away.

COWBOY SLEUTH

Somebody at Infocom must lie awake nights dreaming up packaging. I spent a good half hour just going through all the goodies that come with Suspect before I ever got around to booting up the game.

First, there's an engraved invitation to Veronica Ashcroft-Wellman's Halloween party—and in case you don't know who Veronica Ashcroft-Wellman is or how lavish her parties are, there's a clipping from the local magazine, describing just how posh this affair is going to be. The same clipping also has an article describing realtor William Cochrane's aggressive plans to break up local estates and turn them into "planned communities." His business card is included in the package—with an interesting note on the back for Veronica: "Don't do something you'll regret. (signed) Bill."

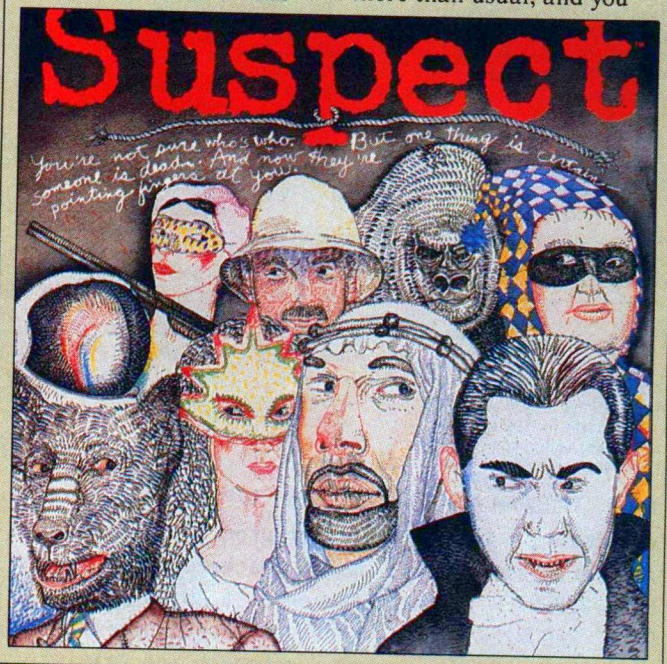
You'll also find a receipt from Costumes Unlimited—you've rented a cowboy suit—and a letter from the editor of *The Washington Representative* asking you to write up the party as a news story. Finally, there is a not very useful (but very funny) guidebook called *Murder and Modern Manners*.

This time around, you are a newspaper reporter and a friend of Veronica's. Unfortunately, before you have much chance to chat with your hostess, she is found murdered—and the murder weapon is the lariat from your cowboy costume! Uh oh! Bad choice of costume. You've just been framed. You have only a few hours to figure out who the real murderer is before they come to take you away. This situation is roughly equivalent to the next-to-last reel of the first Pink Panther movie, in which Peter Sellers had to figure out who was the real villain in the gorilla suit, himself or David Niven.

Suspect has a lot of characters; it isn't an easy game. (It's advertised as "advanced," which is a little like calling Indiana Jones "well-motivated"—something of an understatement.)

Before you can even begin to solve the murder, you have to find out who everyone is. Who's the man in the astronaut suit? Who's the werewolf? Why is Colonel Marston dressed like an African explorer? And who's *really* in the gorilla suit? Where is Inspector Clouseau now that we need him? And why did you choose to wear that stupid cowboy suit in the first place?

As with all Infocom games, be prepared to spend some time working your way through the convolutions of the plot. It's intricate, this one perhaps more than usual, and you



may eventually want to order a hint book from the company.

With this game, Infocom demonstrates (again) that the all-text adventure is an ideal format for a murder mystery. You are no longer a vicarious observer, as you would be in a novel or a film. Here you are a key part of the action. You have to explore the premises, examine objects to see if they are clues or not, follow suspects, interview the other guests at the party, and eventually confront the real murderer with the proof of his (her?) deed.

What makes the game truly exciting are the more than ample opportunities for failure. You can really get yourself in a lot of trouble here.

I'm not going to say much more than that because I hate people who give away punch lines, surprises, and identities of murderers. If you want to find out how it ends, you're going to have to play this one for yourself.

Suspect is the third in the company's series of murder-mystery adventures. The first two were Deadline and Witness. Suspect may be the most devilish yet. Good luck, cowboy! You're going to need it . . .

David Gerrold

Suspect
Infocom
125 Cambridge Park Drive
Cambridge, MA 02140
(617) 492-1031
List Price: $44.95
Requires: Apple II, II Plus, IIe, or IIc; 48K RAM; one disk drive—or Macintosh

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MISSING BATHTUB

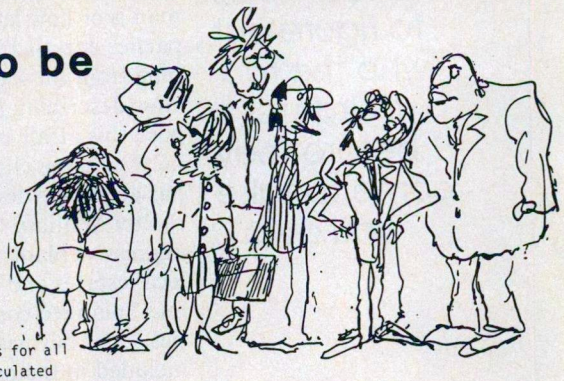
Lord and Lady Southby lived a quiet life on their estate until somebody broke into their house and made off with a valuable antique gold-and-onyx bathtub. Naturally, they called in the authorities. As Inspector Hargreaves, you must use all of your typing skills to solve the case of the missing bathtub.

Forethought bills Typing Intrigue as "the typing tutor with a mystery twist." Missing tubs aside, teaching you to touch-type is the real goal of this educational program for the Mac. It works best with beginners, although veteran touch-typists who need to brush up on their reflexes may find it helpful, too.

The program shows you proper body, hand, and finger positioning and explains the basics of touch-typing. Next, you take a typing test, called an audition, to determine a base typing speed. After these preliminaries, it's all up to your fingers.

Typing Intrigue teaches you typing through repetition. It starts with the home keys—A, S, D, F, J, K, L (the keys your fingers hover over)—and progresses through the keys above and below the home keys. The drills are straightforward. For example, you press the A key three times with your left-hand pinky, then the S key three times with your ring finger, and so on. This is the traditional method of teaching touch typing, and if you're willing to practice, it can improve your speed

PEOPLE TALK databases have to be POWERFUL!! EASY! QUICK!!!



DATA REPORTER

The DATA REPORTER puts your microcomputer at your command in the form of a powerful information management tool. Manipulate your data quickly and easily without programming or computer knowledge. The illustrated and indexed manual, with its numerous examples shows you how to achieve results with the DATA REPORTER. The simple step-by-step customizing feature lets you convert the DATA REPORTER into an general accounting(AP/AR/GL/PAYROLL), bibliography, sales journal, appointment calendar, or whatever application you need. If you want to alter your program, the DATA REPORTER lets you rearrange or add new information to all files without retyping your records.

Running the DATA REPORTER is simplified by prompting and sophisticated error avoidance techniques. Program options require only a few keystrokes to perform functions such as printouts, sorts, searches of records, totalling, etc. The helpful Soundex locator on the IBM version will find your records even if you do not know the proper spelling. When entering data, repetitive information and the current date may be entered with a single keystroke. Quick record entry is accomplished without long delays for disk access. Entering and updating information is done in MEMORY. THE FASTEST WAY POSSIBLE WITH A MICROCOMPUTER.

DATA REPORTER FEATURES INCLUDE: Simple menus for all commands; each record can have up to 10 calculated fields, subtotals and grand totals can be performed on any field; machine language searches and sorts are available on any combination of fields(Sort 300 on-line records in less than five seconds, search 300 records in less than one second); seven search types are available, including----soundex(IBM only), full field, substring, and their complements; sort data on up to three fields. Up to six files of data can stored in one operation; for repetitive tasks, batch sequences of up to 60 inputs can be saved and later performed with a single command(IBM only); file manipulation is simplified by global editing, file merging, file appending, and block deletion of data; features such as file backups, reformatting of files without reentering data, mailing labels, fully copyable disks, optional password protection, and many more make the DATA REPORTER the best data base value.

GRAPHS AND STATISTICS

The Data Reporter Graphics and Statistics program enables you to quickly and easily create graphs from existing data records. The graphs have four different types: bar graphs, scatter graphs, line graphs, and pie charts on your screen or printed. The Graphics and Statistics program will calculate totals, means (averages), standard deviations, medians, and ranges. It also calculates a least squares linear regression when you draw a scatter graph. Totals of all fields may be performed in only a few seconds. All statistics will be displayed on your screen and can be printed with your printer.

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and accuracy.

Typing Intrigue includes two games to give you a break from the lessons. The first, Rain, develops your finger-placement accuracy. Raindrops with letters inside fall from the top of the screen. You must type the letter (without looking at the keyboard—no cheating!) to make the raindrop vanish. If a raindrop reaches the bottom of the screen, the waters rise. Miss enough of the raindrops and you get flooded out. Rain has variable skill levels, from sprinkles to monsoon.

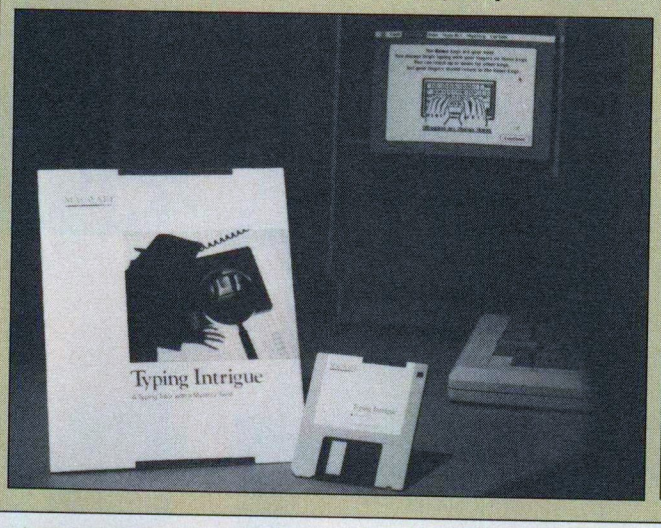
The typing workouts display combinations of phrases and sentences for typing practice. Again, you are supposed to look at the screen and not the keyboard. Although the exercises are not Pulitzer-prize-winning efforts of literary excellence, they vary with each try and do test your touch-typing skills.

As you complete lessons, you gain "clue points." As you may have guessed, you trade these points in for clues. The more clues you obtain, the better your chance of naming the crook and accomplice and discovering the motives behind the crime.

Typing Intrigue monitors your progress as you go along. It records words per minute, errors, and problem keys. The latter feature is especially helpful, for it allows you to pinpoint exactly which keys give you the most trouble. You can then go back and practice those keys to improve your proficiency.

All in all, I'm impressed with Typing Intrigue. It combines practical teaching techniques, an interesting mystery twist, record keeping, and even two games into one easy-to-use program. Macintosh owners searching for typing tutors should investigate Typing Intrigue.

Russ Lockwood



Typing Intrigue
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SOME COMBINATIONS

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N	DOUBLEWIDE EMPHASIZED
O	DOUBLEWIDE EMPHASIZED DOUBLESTRIKE
P	CONDENSED DOUBLEWIDE
Q	CONDENSED DOUBLEWIDE DOUBLESTRIKE
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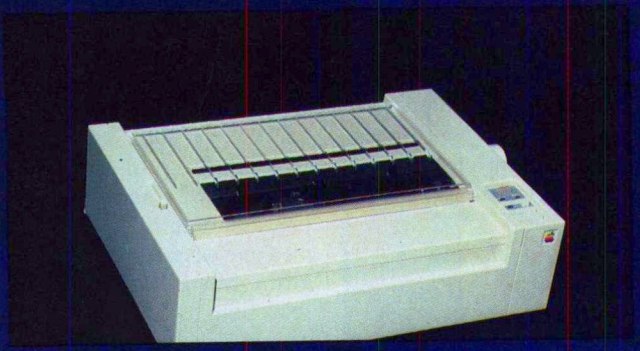
THE RIGHT CONNECTIONS

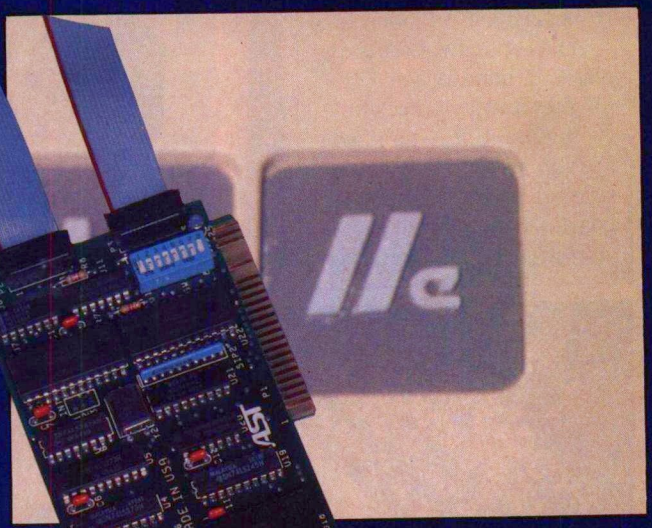


Printer serial port

Modem serial port

Clock/Calendar

Software Utilities



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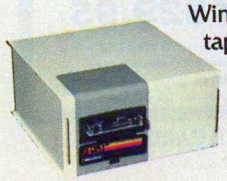

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Las Vegas, Nevada: a glittery haven in the desert for tourists and gambling mavens intent on breaking the bank at the casinos. For most, the dream of instant riches lies shattered at the bottom of a penniless pocket, but for those select few who can combine skill and luck, the downtown strip is a street paved with gold.

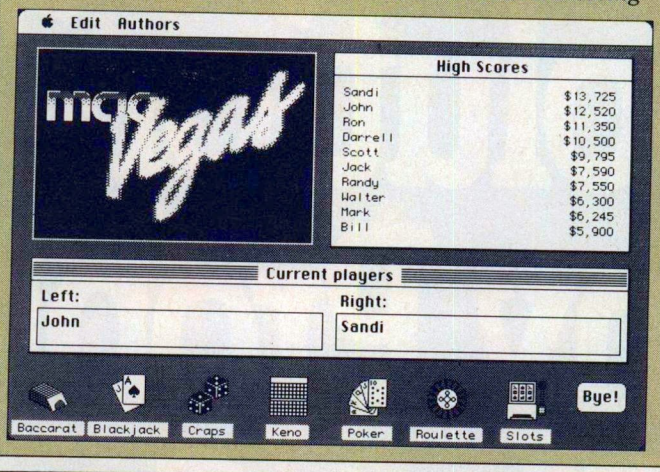
MacVegas transforms your Macintosh into a one-mouse casino, complete with seven gambling games: Baccarat, Blackjack, Craps, Keno, Poker, Roulette, and Slots. Each of these has four variations of "house rules" (betting minimums and maximums and odds of winning). Poker and Roulette are for solo play only; the rest of the games accommodate one or two players. With the exception of entering your name, you control all play with the mouse.

Play proceeds smoothly. If you understand the rules of the particular game, you can start immediately. You pick up and drag chips to a betting area (subject to minimums and maximums) and then play the game by clicking on a particular choice from several options displayed on the screen. Additional decisions, such as whether to take another card or not, require extra points and clicks.

MacVegas comes with a 158-page paperback, *A Book on Casino Gambling* by Virginia Graham and C. Ionescu Tulcea (Pocket Books). The book explains each game in detail and offers tips on beating the casino.

The program takes advantage of the Macintosh graphics to produce clear, sharp representations of cards, chips, betting areas, dice, and other gambling paraphernalia. The animation is smooth, especially the shuffling cards and rolling dice.

Your enjoyment of MacVegas will depend on your interest in gambling games. If you've ever felt the need to escort Lady Luck to a table in Las Vegas, Reno, or Atlantic City, yet were unwilling to risk real dollars, MacVegas is the answer. If you really are planning a casino trip, on the other hand,



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- System includes sample programs on disk.

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A few applications may include the monitoring of ● flow ● temperature ● humidity ● wind speed ● wind direction ● light intensity ● pressure ● RPM ● soil moisture and many more.

A/D & D/A

A/D & D/A Features:

- Single PC card
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- 8 channels D/A
- Superfast conversion time
- Very easy programming
- Many analog ranges
- Manual contains sample applications

A/D SPECIFICATIONS

- 0.3% accuracy
- On-board memory
- Fast conversion (.078 MS per channel)
- A/D process totally transparent to Apple (looks like memory)
- User programmable input ranges are 0 to 10 volts, 0 to 5, −5 to +5, −2.5 to +2.5, −5 to 0, −10 to 0.

The A/D process takes place on a continuous, channel sequencing basis. Data is automatically transferred to its proper location in the on-board RAM. No A/D converter could be easier to use.

D/A SPECIFICATIONS

- 0.3% accuracy
- On-board memory
- On-board output buffer amps can drive 5 MA
- D/A process is totally transparent to the Apple (just poke the data)
- Fast conversion (.003 MS per channel)
- User programmable output ranges are 0 to 5 volts and 0 to 10 volts

The D/A section contains 8 digital to analog converters, with output buffer amplifiers and all interface logic on a single card. On-card latches are provided for each of the eight D/A converters. No D/A converter could be easier to use. The on-board amplifiers are laser-trimmed during manufacture, thereby eliminating any requirement for off-set nulling.

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FEATURES

- 4.5" square for standard card cage and 4 mounting holes for standard mounting. The signal conditioner does not plug into the Apple, it can be located up to ½ mile away from the A/D.
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The I/O manual includes many programs for inputs and outputs.

Some applications include:
Burglar alarm, direction sensing, use with relays to turn on lights, sound buzzers, start motors, control tape recorders and printers, use with digital joystick.

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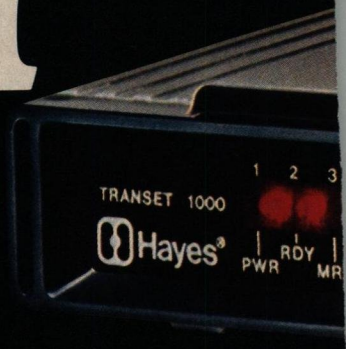
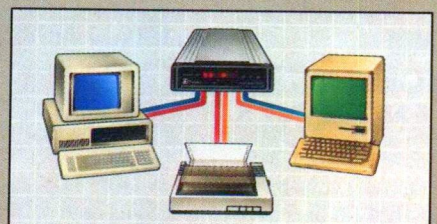


Transet 1000.™ The print buffer, communications buffer, port expander, printer sharer and I/O switcher. All in one.

Anyone with a personal computer and one or more peripherals has faced the all-too-familiar dilemma. You need your computer to do an important job. But you're forced to wait for the system to finish one job (printing, communicating, whatever) before you can go on to the next one. Or you need to stop what you're doing to switch cables when you want to use another peripheral.

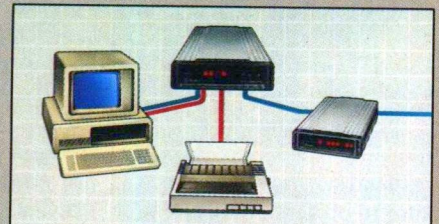
Wait no more. Now Hayes introduces an innovative new device that lets you perform many jobs—at the same time—independent of your computer. Transet 1000. It works with a wide range of systems and configurations. And it allows you to continually expand your system as your needs grow.

Transet 1000 frees your computer from waiting on your printer or modem—so you and your computer can go on to another task. It even lets you print out documents in pre-set formats without having to go back into your computer. At the same time, Transet 1000 can operate unattended mailbox communications—24 hours a day—even if your computer is turned off.



Two computers can share one printer with Transet 1000. Or, you can use Transet 1000 to let two computers communicate with each other.

In addition, Transet 1000 is a port expander and software-controlled I/O switcher. Now files can be easily directed and redirected to different peripherals, without physically changing cable connections.



Even while printing, Transet 1000 acts as a communications buffer and 24-hour mailbox. And I/O switching lets you route information among peripherals, without switching cables.

Transet 1000 contains a standalone microprocessor, and comes with 128K of memory. It operates with any RS-232C interface computer, and has optional accessory kits available for the IBM PC and PC XT, Macintosh and Apple IIc. Kits contain the necessary host cable, a user guide and menu-driven software that lets you graphically set up or customize port parameters and printing formats. Cables available for IBM PC AT, other computers and peripherals.

Like all Hayes products, Transet 1000 combines sophisticated capabilities with easy operation. Just as Hayes set the standard in personal computer communications, now Hayes is taking the lead in computer task management.

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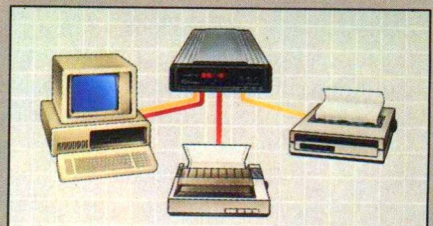

Transet 1000 allows printing on both a dot matrix printer and letter quality printer, while freeing your computer for other tasks.

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you may want to sharpen your gambling skills before you go.

Of course, you do lose the casino atmosphere when playing at home or in the office—after all, MacVegas does not include skimpily-clad beauties serving cocktails or bowlegged tourists in loud Hawaiian shirts sweet-talking the slot machines—but if you are looking for an excellent gambling simulation for the Macintosh, take a serious look at MacVegas.

Russ Lockwood

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Requires: Macintosh
CIRCLE READER SERVICE NO. **353**

SECOND CHANCE ON THE RUSSIAN FRONT

About ten years ago, I was visiting a friend's house and discovered that he had a large—and I mean *large*—map of the Pacific Ocean spread out across his den floor. The map showed half of the planet, almost everything between China and California, Australia and Alaska. Covering the map were thousands of tiny markers representing battleships, aircraft carriers, fighters, bombers, troop carriers, PT boats—one of them was probably even Amelia Earhart.

When I asked him, "Don, what are you doing here?" he replied, "I'm Japan, and I'm invading the United States. Only this time I'm going to do it right. I'm not stopping at Pearl Harbor—I'm going on to attack the shipyards at San Diego as well. There's a guy in Boston who's going to be very very surprised."

"Not to mention the guys in Washington, D.C."

> Kampfgruppe is a simulation of tactical-level combat on the Russian front.

I said. "Does Roosevelt know about this?"

"He will tomorrow morning . . . "

That was my first exposure to professional-level war gaming, a kind of battle simulation so complex that it sometimes has to be played in slower-than-real time. "What it really needs," Don explained to me, "is a computer to keep track of all the moves."

Right. It was inevitable.

Kampfgruppe is a simulation of tactical-level combat on the Russian front during the years 1941–1945. (And we all know how that turned out. The decision to invade Russia was one of Hitler's worst military errors.) But the people at Strategic Simulations obviously think that the German army could have won that campaign, and this game is an opportunity for would-be generals to test their own battle prowess in the same circumstances. Actually, the game gives you the opportunity to set up a variety of military situations.

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Make no mistake here. This program is not so much a game as it is a very real simulation of battle conditions. There are no flashy arcade graphics here, no explosions, no sound effects, no clever animation. What there is in Kampfgruppe is the bookkeeping that is necessary to stage a large-scale battle, translated into a computer environment for advanced-level war gamers.

As commanding general, you will have to determine the moves of *every* man and piece of equipment under your command. Just entering the appropriate orders can be a long and involved process. You can play the game either as solitaire against the computer or as a two-player game, with the computer keeping track of all the details. You can play either side of the battle, or you can let the computer play both sides.

If you're not a war gamer, then Kampfgruppe is definitely not for you. If you are a war gamer, then you probably know how hard it is to find experienced partners to play against. You probably also know how annoying all that bookkeeping can be sometimes. Kampfgruppe can be a worthwhile solution to both of these problems.

If, like me, you're curious about war gaming but haven't had a lot of opportunity to get deeply into it, then Kampfgruppe may be a good introduction, but be prepared to spend a couple of days studying the manual and another few days learning your way around the program. Kampfgruppe is not a game as much as it is a career. Be warned. It isn't dull, but it is involved—if you're not totally committed to the task, then it can quickly become tedious.

But then again, nobody ever said that fighting a war was a good time.

David Gerrold

Kampfgruppe
Strategic Simulations
883 Stierlin Road
Bldg. A-200
Mountain View, CA 94043
(415) 964-1353
List Price: $59.95
Requires: Apple II Plus, IIe, or IIc; 48K RAM; one drive
CIRCLE READER SERVICE NO. **354**

PHILOSOPHER'S DILEMMA

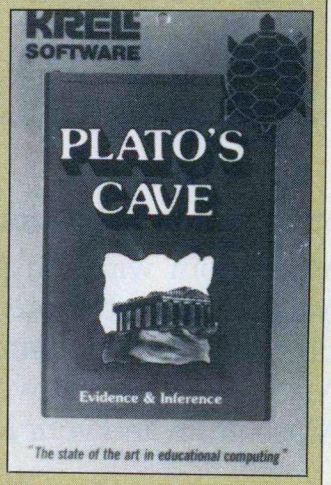
Approximately 2500 years ago, the Greek philosopher Plato posed a metaphor concerning shadows cast upon the walls of a cave. In essence, he argued that the realities we believe to be true are actually illusions and distorted images of a higher reality.

Plato's Cave from Krell Software takes this philosophic question and turns it into an exercise in scientific inquiry. You send beams of light into a cave and watch what happens after they strike hidden objects within it. Based on the data you receive, you then try to determine the nature and location of the objects.

The cave is a grid of dots surrounded by lettered and numbered entry and exit points. The grid ranges from a small 3 × 3-dot matrix to a large 13 × 13-dot matrix. The program has five types of objects—right reflector, left reflector, absorber, mirror, and a random object. The right and left reflectors deflect the light beam 90 degrees, the absorber stops the light beam, and the mirror reflects the light beam 180 degrees. The random object can take on the property of any of the other four objects, and it can also change properties during play.

You place up to seven objects in the cave—you choose the number, and the program chooses which types.

You pick an entry point, a beam of light enters the cave, and the program reports what happened to the light beam inside the cave and where it exited. Armed with this information, you figure out which objects are where.



The program uses six difficulty levels, with each level allowing an additional type of object. Other features include reviewing data, reviewing play, and providing hints.

> Plato's Cave is an interesting brainteaser for all ages.

Plato's Cave is an interesting brainteaser for players of all ages. Young children can start with small matrices, few objects, and a low difficulty level, and adults can increase the size and complexity of the cave. I cannot say the program will solve the reality vs. illusion dilemma, but Plato's Cave does provide solid mental exercise.

Russ Lockwood

Plato's Cave
Krell Software Corp.
1320 Stony Brook Road
Stony Brook, NY 11790
(516) 751-5139
List Price: $49.95
Requires: Apple II Plus, IIe, or IIc; 48K RAM; one disk drive
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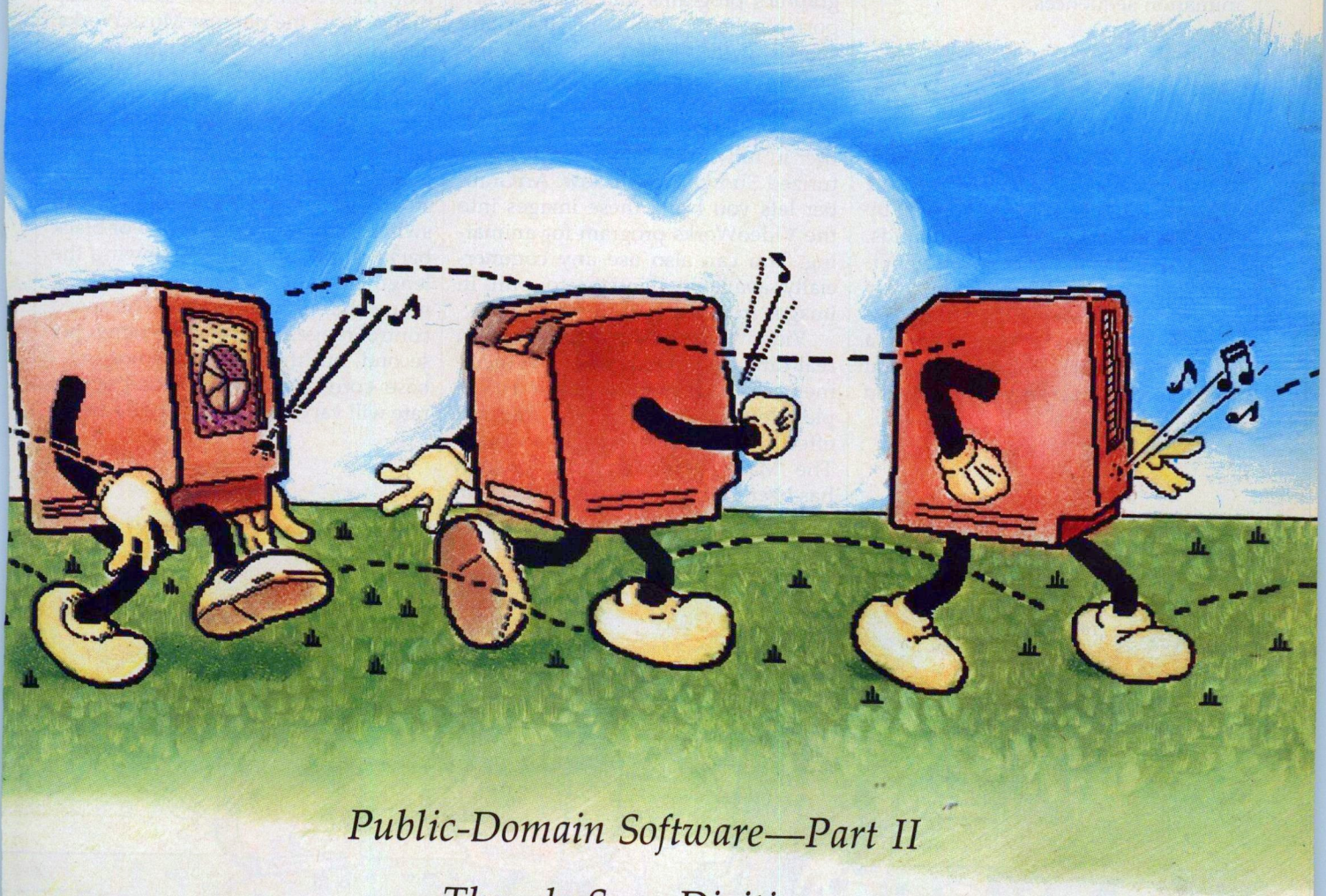
A+/AUGUST 1985

Macintosh

FEATURING THE APPLE 32 LINE

VideoWorks

An Animation Sensation



Public-Domain Software—Part II

ThunderScan Digitizer

MacPaint Tips

VideoWorks doesn't make you wait for instant animation gratification.

VideoWorks

VideoWorks is one of the applications that best exemplifies the unique capabilities of the Macintosh. It is a comprehensive three-disk package from Hayden Software that includes VideoWorks, an animation application program with three tutorials and a special-effects demo; an Art disk, which provides predrawn modular figures for animation; and Movies, an anthology of fully developed sample animation sequences.

VideoWorks effectively employs the Mac user interface of menus and windows, controlled by mouse and/or keyboard commands. Animating has never been easier. VideoWorks operates most effectively on the Macintosh 512K, but it has been honed down to work even on a single-drive 128K machine, a feat akin to a circus act in which a dozen clowns explode out of a tiny car.

In less than five minutes, you can be following that bouncing ball.

VideoWorks can animate figures you've created within its own two graphics programs and can also import MacPaint documents from any source with ArtGrabber, its Clipboard-type desk accessory. ArtGrabber permits you to view quickly all the MacPaint documents in a disk, either in full-scale detail or in a miniaturized ShowPage window. ArtGrabber lets you bring these images into the VideoWorks program for animating. You can also use any commercially available digitizer to pull in images from the outside world.

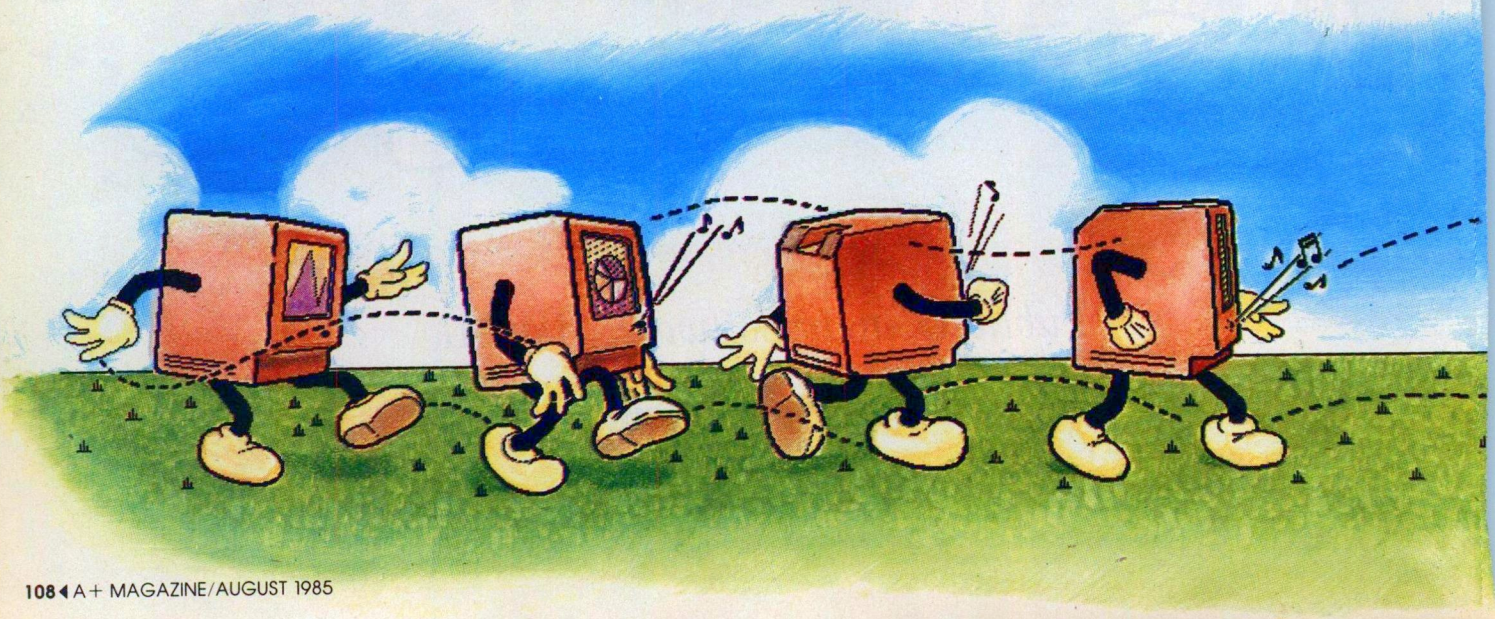
VideoWorks can animate either in real time or in frame-by-frame increments. The icing on the cake is a complete menu of sound and musical effects to complement the visuals. The Mac's potential for animation has been correctly realized here as an esthetic of black-and-white linear precision, as opposed to Apple II graphics programs in which the details are coarser but enhanced by color (see "Making It Move," *A+*, May 1985, pages 76–82).

Inside the Mouse Factory

The well-written documentation includes background on the history of animation, and its step-by-step continuity helps clarify what is really a complex program. VideoWorks' creator, MacroMind, is the same group that gave us the popular MusicWorks, and the two programs share similar structures for graphic control of form and duration.

The VideoWorks screen opens up with a control panel at the top right, including toggles for starting and stopping, speed control, sound switch, light switch for white or black background, and a grid showing the length of the sequence and how many channels are active. The speed control ranges from 3 to 60 frames per second, but the program is not time-base corrected, so the actual screen rate will vary, depending on the mem-

MICK WIGGINS



ory load of the active sequence.

At the bottom of the screen is the Cast, an eight-cell storyboard strip. As you create each animation element (called a Castmember in the manual), its image is automatically filed in a Cast cell. At the right end of the Cast is the row selector, with boxes that can call up eight more strips, for a total of 64 cells of Castmembers. Owners of 512K Macs see an additional bank selector that lets them access the 256 cells they have available. At the far end of the Cast is the QuickDraw Primitives cluster, a compact graphics kit. These are just two of the seven working windows available from the upper menu bar or through keyboard commands.

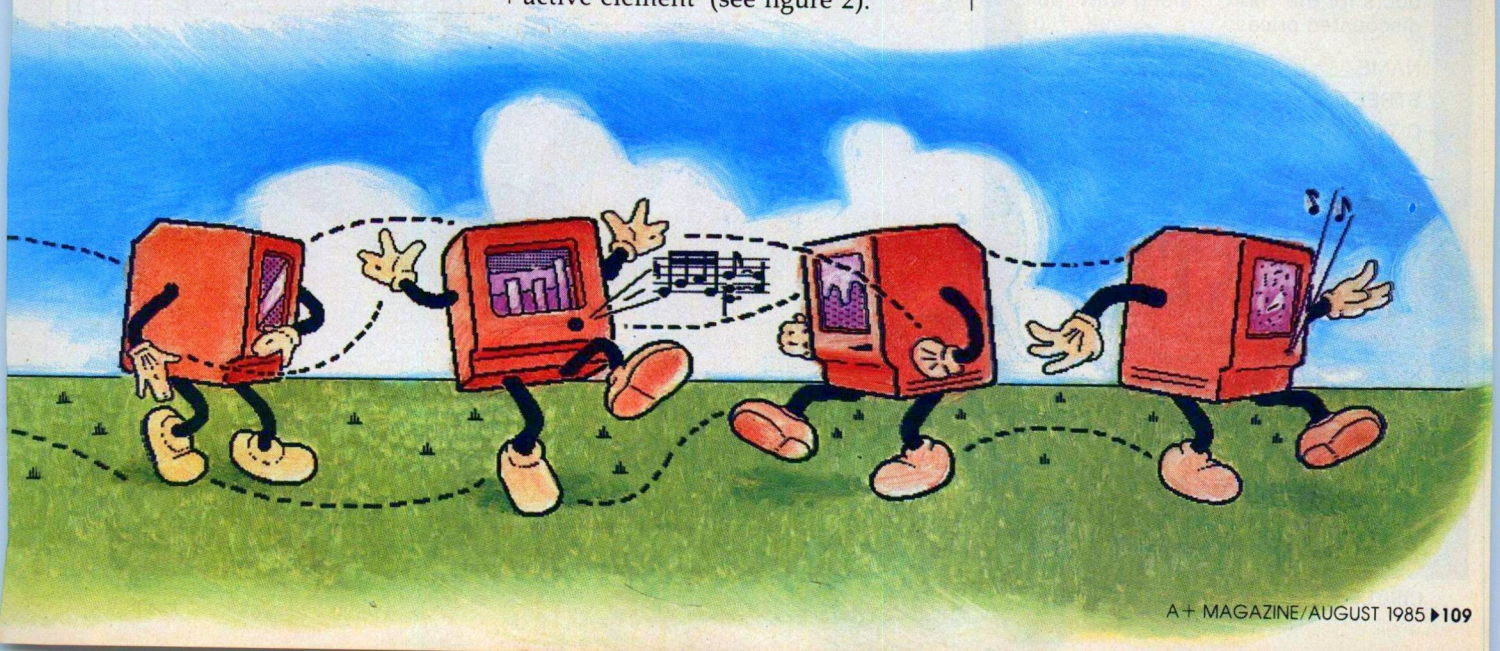
CheapPaint is a MacPaint-type graphics program with most of the latter program's features, including text and a full Fatbits option. To be fair, CheapPaint is a misnomer—perhaps it should have been called MiddleIncomePaint or UpwardlyMobilePaint. The QuickDraw primitives are cheaper, especially in terms of memory usage. You can draw basic shapes directly on the screen, filling them with patterns available from the Draw menu, to create animation elements. QuickDraw is especially effective for laying in backgrounds. From these two internal graphics sources alone, you can create enough shapes and forms to explore VideoWorks' vast sound stage of a program.

VideoWorks doesn't make you wait for instant animation gratification. In less than five minutes, you can be following that bouncing ball. From CheapPaint's palette you can create a circle on the active easel and see it automatically appear in miniature within the first cell of the Cast strip (see figure 1).

You have just created a "sprite." A sprite is an autonomous animation element, whether it is a dot, a duck, or a defender. With true Mac ease, you can make the CheapPaint window disappear by clicking on its Close box and then drag a copy of the sprite from its cell in the Cast and place it anywhere on the screen. When you release the mouse button, a grid of nine small squares appears over the sprite, indicating that it is an active element (see figure 2).

To create a real-time animation sequence, you click the Play button on the panel and then drag the circle around the screen with the mouse, bouncing it off the walls of the screen like a ball in a squash court, if you wish. You can issue a keyboard command that clears all working windows on the screen so you can see the sequence unimpeded (see figure 3). While the program is in the Play mode, the circle-sprite will continue to cycle through those motions you just gave it. From that moment on, you are a giver of life—an animator!

Real-time animation is useful for "motion sketching," but soon you will be designing sequences that demand the interaction of many elements, moving at different rates. VideoWorks' Tweak window is an incremental motion generator that lets you control precise frame-by-



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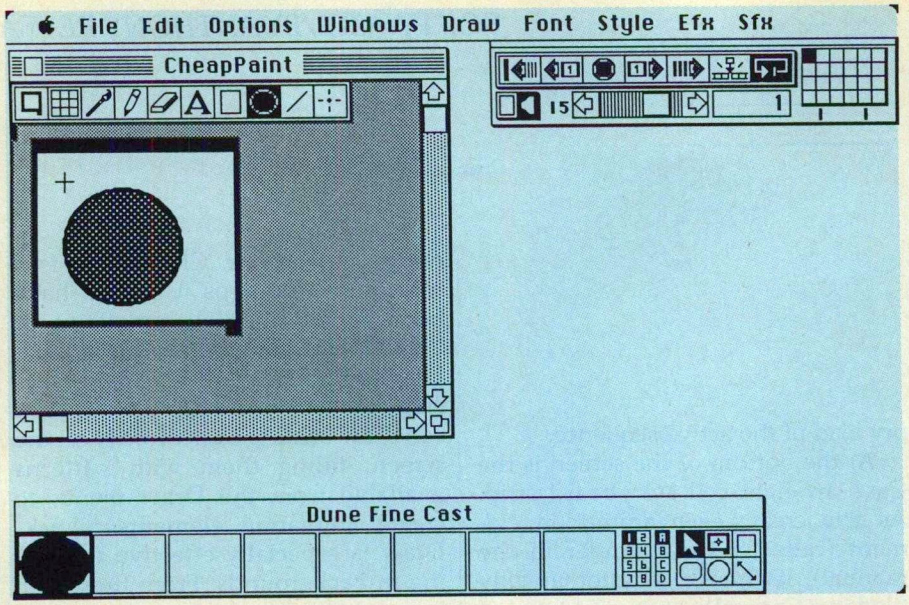

Figure 1

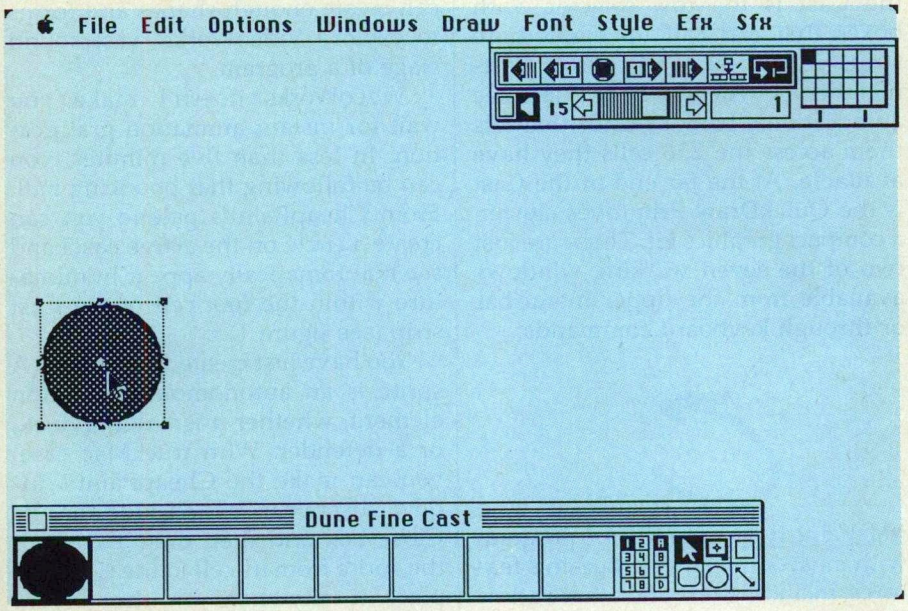

Figure 2

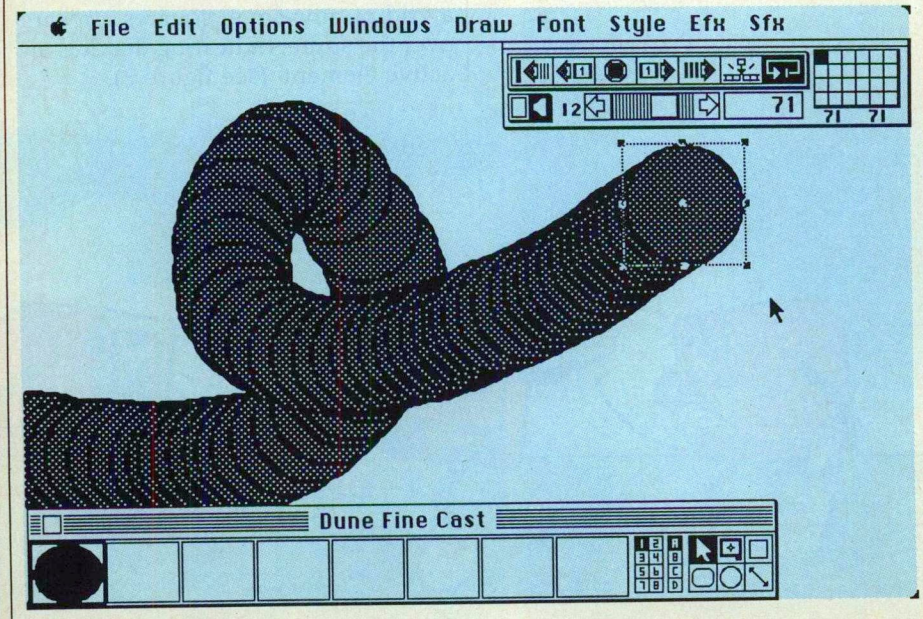

Figure 3

frame movements by directing an x/y vector line in a mouse-operated panel. The Tweak function affects whatever element is active on the screen. Activating each element in turn—by clicking on it—and then tweaking it frame-by-frame gives you the control to achieve smooth choreography.

The Score is the editing bench and continuity chart for VideoWorks. It is a resizable window divided horizontally into channels, with the sound channel on top and animation channels from A to X below. Each channel, or row, shows the progress of one animation element, whether it is an active sprite or a static background. A simple code in the channel indicates the track of the element. Three toggles allow you to choose variations of the code for display, to trace the elements' identities and motions. The channels also have vertical divisions, representing the frame numbers, extending to more than a thousand frames for a sequence. The maximum number of frames in a sequence is 23,000 on a 512K Macintosh.

All animation elements occupy channels A to X in the order that you create them, and up to 24 different elements can share the screen at the same time. In the Score you can cut and paste movement passages with the ease of word processing—true "motion processing." The larger and more complex an element is, the slower it will move, and the longer it will take for patterns and textures to refill. According to Marc Canter, president of MacroMind, that slowness is due to the limitations of the Macintosh's architecture. The computer does not contain a VLSI special graphics hardware chip for anima-

Figure 1: You can enlarge the easels within CheapPaint to accommodate larger-size sprites. When the drawing is complete in the easel, its image appears in a cell in the Cast.

Figure 2: You drag the image from its cell in the Cast, and the sprite appears on the screen. The attribute squares show that it is active, and the mouse pointer is on the central square, for moving the sprite without changing its shape or size.

Figure 3: I moved the sprite in real-time animation by dragging it while the Play function was on. Using the No Erase and the Matte choices from the Efx menu, I had it leave a trail.

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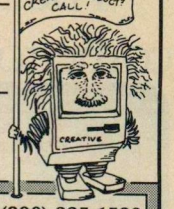

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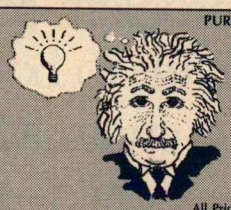

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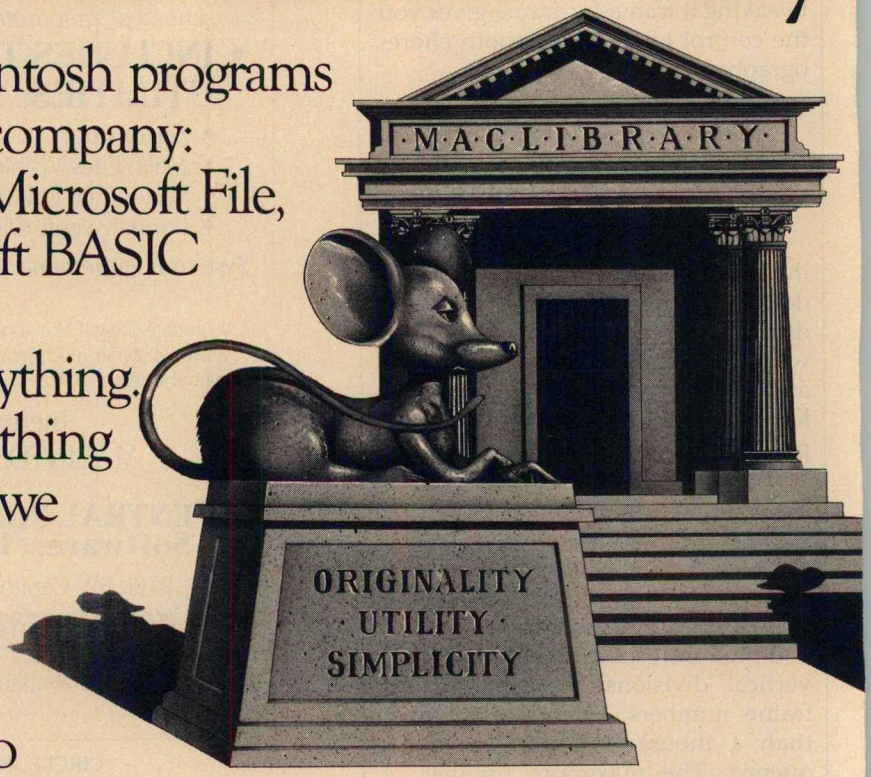

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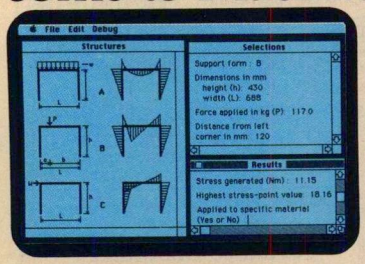

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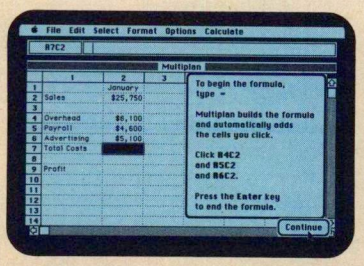

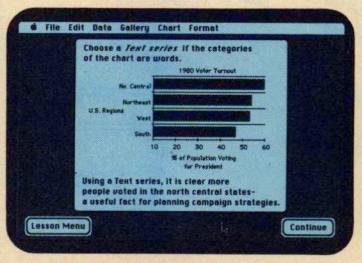

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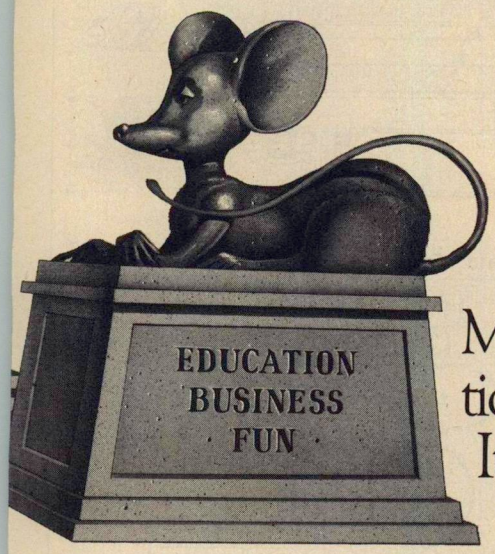

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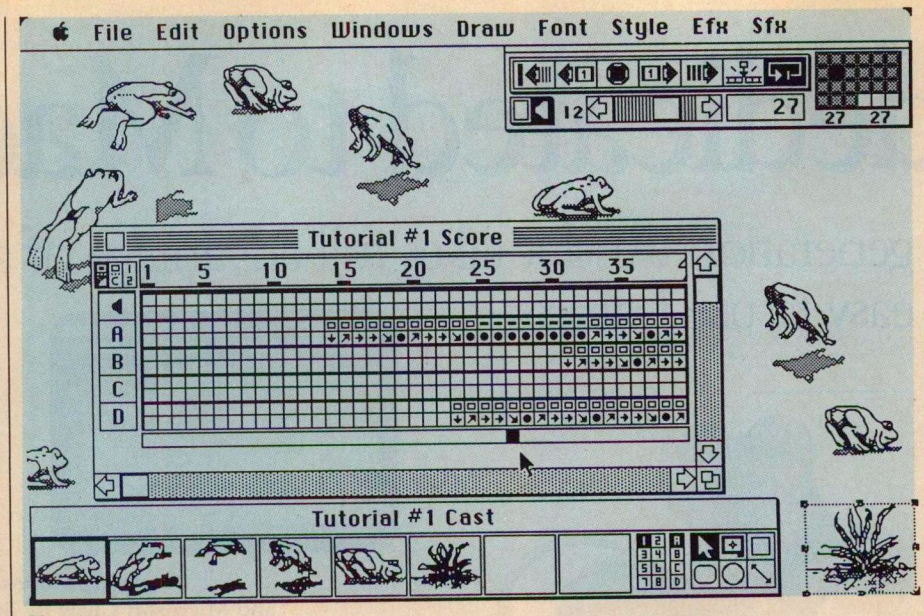

Figure 4

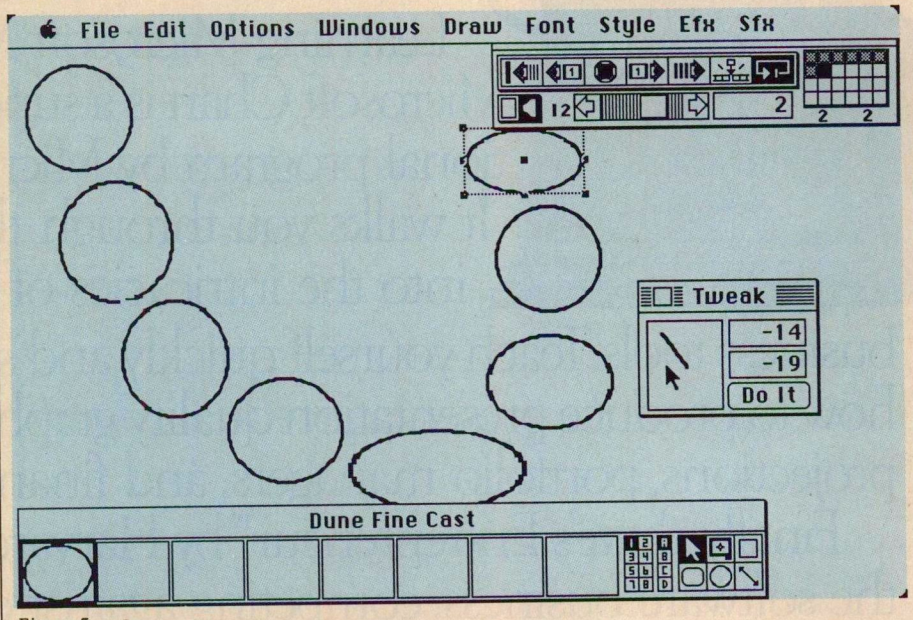

Figure 5

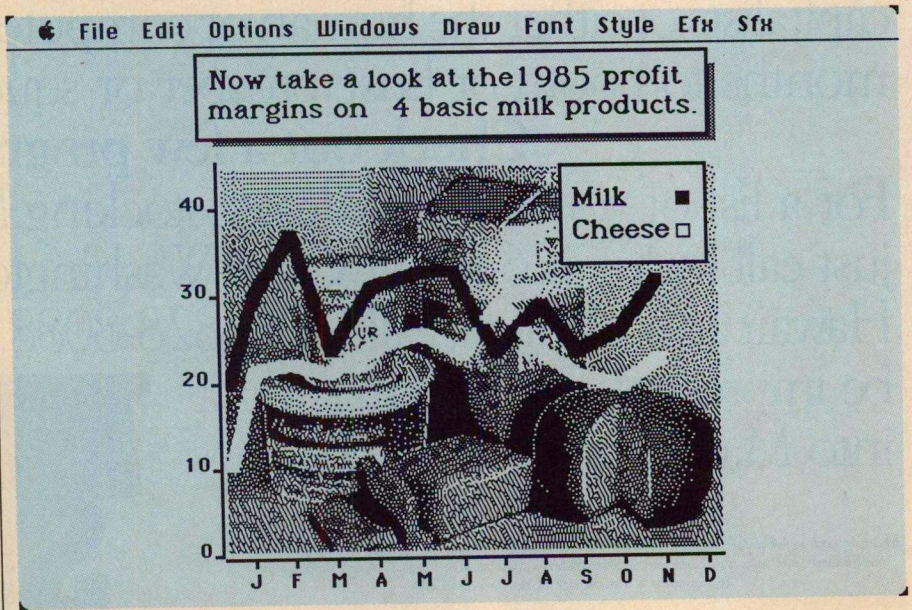

Figure 6

tion, so all movement must be software-driven.

One of VideoWorks' most powerful features is the Playback function. Located at the bottom of the Score window, the Playback Head is a black square that runs along its own channel, called the Playback Bar, pacing the action when a sequence is playing or marking where you pause. When you use the mouse to point anywhere on the Playback Bar, the Playback Head pops up, whether the sequence is playing or at rest. Whatever elements occur at that frame in the sequence will appear on the screen. You can drag the Playback Head to the right and to the left, and the elements will move forward and backward. If a sound track corresponds to that section, it will play as well. Just as professional animators might test their characters' movements by flipping a stack of drawings back and forth, you can sketch, shape, and fine-tune your designs quickly and easily with VideoWorks' Playback mode.

VideoWorks' three tutorials detail the advanced features of the program. Tutorial 1 shows you how to create a realistic sequence by making a frog leap and then, by cutting and pasting in the Score window, unleashing a herd of frogs jumping across the screen (see figure 4). Tutorial 2, along with the Efx Demo sequence, demonstrates how you can manipulate foreground and background priorities in several ways by using the Efx menu. Tutorial 3 shows you how to further modify a sequence by putting borders on the animated text blocks of a sales presentation.

What makes good animation so

Figure 4: In this sequence from Tutorial 1, a fully developed Cast is running with several figures on the screen at the same time, and the bush has been activated for modification. The Score is open, showing channels with motion code, and the pointer is at the Playback Head.

Figure 5: I moved this sprite with the Tweak generator for precise positioning and then stretched and squashed it in each position to emulate a bouncing rubber ball.

Figure 6: You can enhance and dramatize business graphics with animation. A graph in motion is sure to capture your clients' attention. Which line will make it to the top? A digitized image for the background gives the graph customized identity.

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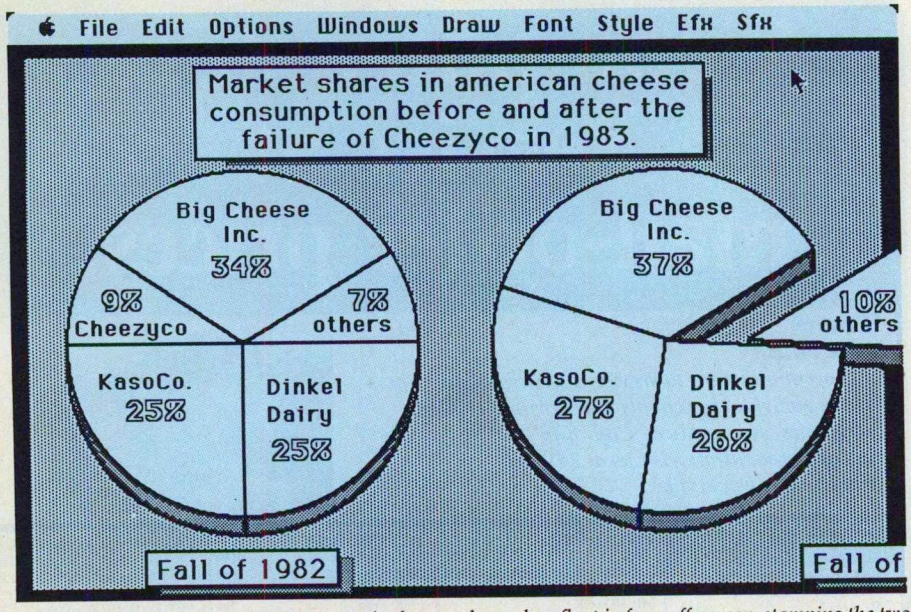

Figure 7: Animation will put sky in your pie chart as the wedges float in from off-screen, stamping the two annual results with authority.

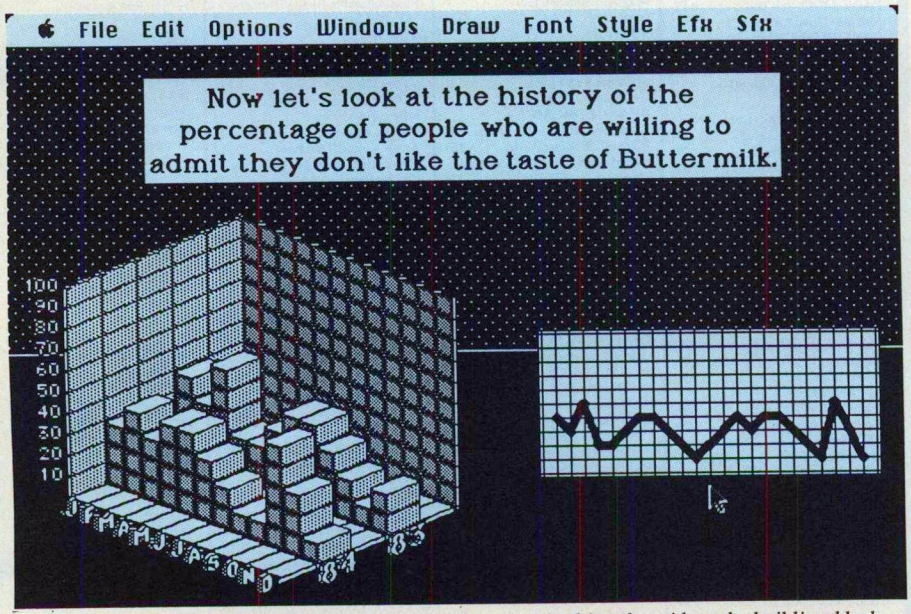

Figure 8: Three-dimensional comparisons can march in time in this cube grid, as the building-block elements show the totals. The sound track matches the lows and highs with an electronic tone.

vital, vivid, and memorable? Not movement alone. Like us, animated objects should be subject to gravity, velocity, and inertia. Their character is revealed by the *way* they move. VideoWorks offers an unprecedented degree of expressive control for "sculpting" life into computer animation. You can manipulate sprites in real-time animation, either as finished movements or as tests for further development. If you want to do frame-by-frame animation, you can use the Tweak function or drag the sprites with the mouse, from position to position. All of these methods permit immediate playback of a movement to see how well it works, and, equally important, changes to shape the movement more precisely and expressively are easy to make.

The nine squares, or attributes, that lie over an element when it is active are more than symbols. They are graphic identity coordinates that you can use as shape-modification toggles. By dragging corner and side squares, you can enlarge the sprite or stretch it in different directions. You can move your bouncing ball step by step and change its shape frame by frame, so that when it's in motion, it will seem to be reacting to flight like a real rubber ball (see figure 5). By enlarging and shrinking the ball frame-by-frame, you'll make it appear to come closer and then recede. In Tutorial 1 you can stretch the bush vertically a little bit in each frame. When you play the sequence again, the frogs will be hopping by a bush that grows taller by the second.

Some shaping modifications, such as trace edges, flipping, mirroring, or spray painting for shadows are unavailable within CheapPaint, but ArtGrabber makes it easy to port the sprite or background to MacPaint and bring it back. If the MacPaint program is equipped with T/Maker Graphics' ClickArt Effects, full rotation, distorting, and perspective stretching will be available as well.

The Art disk in the package is not only good clip art, but also a thoughtfully designed aid for advanced animation techniques. Files include dancers, horses, backgrounds, robots, men and women walking, and even bugs—but then what computer program doesn't have bugs? The chart kit contains systems for constructing animated business charts, with arrows, x/y axis scales for graphs, divisible wedges for pie charts, and a three-dimensional-cube grid (see examples on following pages). The three "Cheez Biz" sequences in the Movies disk (figures 6–8) use these systems to demonstrate how animation can enhance business presentations.

The perspective file helps you create objects and backgrounds in depth. The "PerCar" movie, with its video-game action, uses the shadowed perspective building blocks to show you how convincing background-to-foreground movement can be simulated in simple ways. All the files in this disk include text that explains the most effective uses of the drawings.

You can animate your technical and scientific demonstrations with VideoWorks, as demonstrated by the "Ear" illustration on the Movies disk. When graphics are too complex to be drawn economically on the Macintosh, you can import any MacPaint image or create one with a digitizer. Thus, for instance, a map of the ancient world can have arrows moving across continents to dramatize migrations, and an electronic-circuit diagram can show currents flowing and gates opening and closing. For education, training, and sales needs, VideoWorks animation

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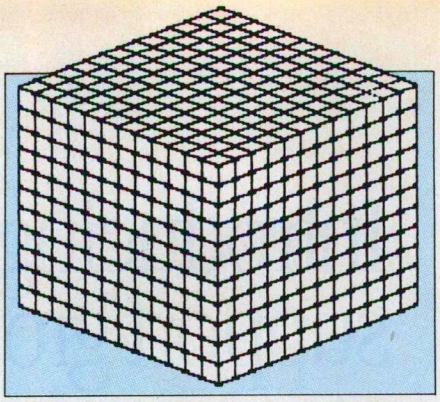

Figure 9: The Chart Kit provides sophisticated building blocks for constructing animated charts, as well as modules for other three-dimensional applications (see figure 10).

can replace costly film and videotape production in many instances. Because of its strong interactive structure, VideoWorks can even emulate applications on videodisc systems.

Sound Effects

More than 82 different sound and musical effects are available in nine submenus, including alarms, birdcalls, helicopters, and Bach. The Mac's four-voice sound generator has never had such a workout! The sound effects are easy to record into the Score. You darken the part of the sound channel above the frames you want the effect to accompany, by clicking and dragging, and then pull down the Sfx menu. Click on any title, and its code will be automatically pasted into the sound channel. While the sound channel is darkened, you can sample VideoWorks' entire sonic repertoire by selecting effects from the menus and then listening as the Play mode repeats, or use the Playback Head to "strum," or activate, them.

Some spot effects, such as footsteps, drumbeats, and whistles, are only a few frames long. Others, such as the forest fire or the electronic drone, are continuous. The musical effects' duration depends on the lengths of their phrases.

Although the menus do not identify them as such, several effects are "synergistic." They are interlocked with the movement of elements on the screen, and the pitch or key of the sound will rise and fall, and the tempo will slow and quicken in pace with the action.

MacroMind reports that it is working on a program to link MusicWorks compositions to VideoWorks animation, but until that becomes a reality, there is no way to import sound files. The program lacks a fade-in/fade-out function, and it does not let you mix

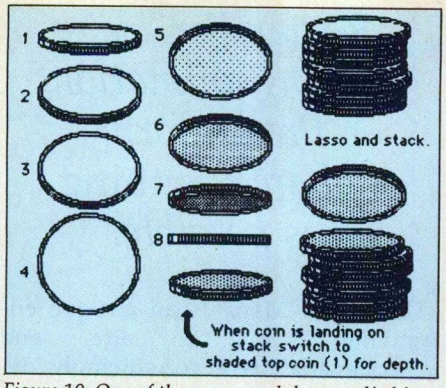

Figure 10: One of the many modules supplied in the Chart Kit for use with three-dimensional applications.

or overlay the sounds, but in minutes you can experience your own sprite whooshing, twittering, exploding, and break-dancing.

VideoWorks' Movies disk will whet your appetite for more. Not only do these 19 sequences demonstrate the variety of animation movements, styles, and strategies that VideoWorks is capable of, but they can also become advanced tutorials.

ANIMATED BUSINESS

VideoWorks has tremendous potential as a serious business tool. You can use the program to bring your business presentations to life by adding animation and sound effects to charts, graphs, diagrams, and text. Any image that can be stored as a MacPaint document can be animated with VideoWorks (you can type ⌘ Shift-3 to save any Mac on-screen image as a MacPaint document). VideoWorks also has a special set of sound effects for use in adding fanfares to business animation.

Imagine how much more impact your presentation would have if the wedges of a pie chart came flying in from the sides of the screen and assembled themselves into a completed chart as you told a client the success story that the chart represented. Or bars could grow on a graph as you explained how sales had grown. For a grand finale, the lines on a graph could zoom off the screen, accompanied by an explosion of dollar signs.

VideoWorks makes producing lively, eye-catching presentations a snap, and an animated presentation will help make your message more memorable. VideoWorks adds an exciting new dimension to business software and gives the Macintosh a tool that is not available on any other system.

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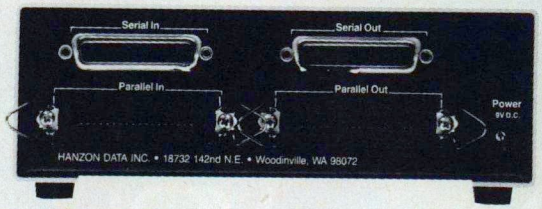

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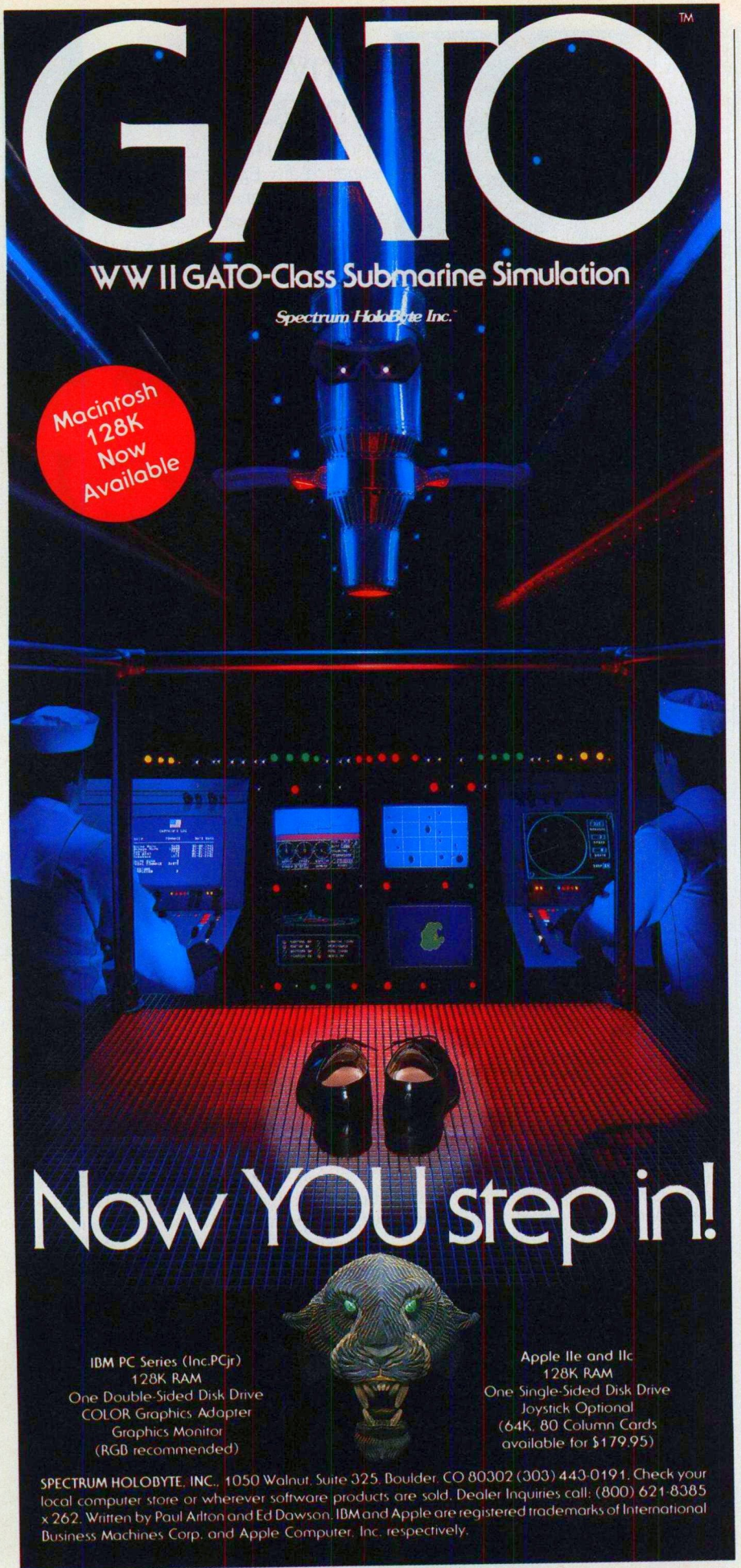

Remember, we're talking animation, the art form where anything *is possible.*

The "1560 Man" is an antique engraving come to life, and "Spacewalk" is a convincingly detailed clip of a space-shuttle mission in action. "Ear" demonstrates applications for scientific and technical subjects, and "BotBot" uses a split-screen format with two views of a robot on the move. "Radar Luv" and "Walk the Dog" reveal the principles of the "traveling" backgrounds professional animators use, even though the manual does not describe them.

You can use the Movies disk as a "ScreenTest" studio. To allow enough memory room, divide the titles and copy each half onto a separate disk; then feel free to examine and disassemble each sequence to see what makes it click. Open up CheapPaint to see how the animation elements were drawn, and modify them there. Look at the Score to see how the movements have been structured. Lay in different sound tracks. Rearrange the action. Cut and paste a character from one movie to another. Who says you can't have a snake charmer on his magic carpet fly by King Kong, or a bubbling skindiver swim along a freeway? Why not create a totally new movie called "Punks in Space" by combining backgrounds, props, and characters from the "Wetlegs," "Spacewalk," and "Dance Fever" sequences. Remember, we're talking animation, the art form where *anything* is possible. ✚

Anthony Reveaux is a San Francisco writer, editor of Computer Publicity News, *and a contributing editor of* Artweek; *he also teaches film history at Sonoma State University.*

PRODUCT INFORMATION

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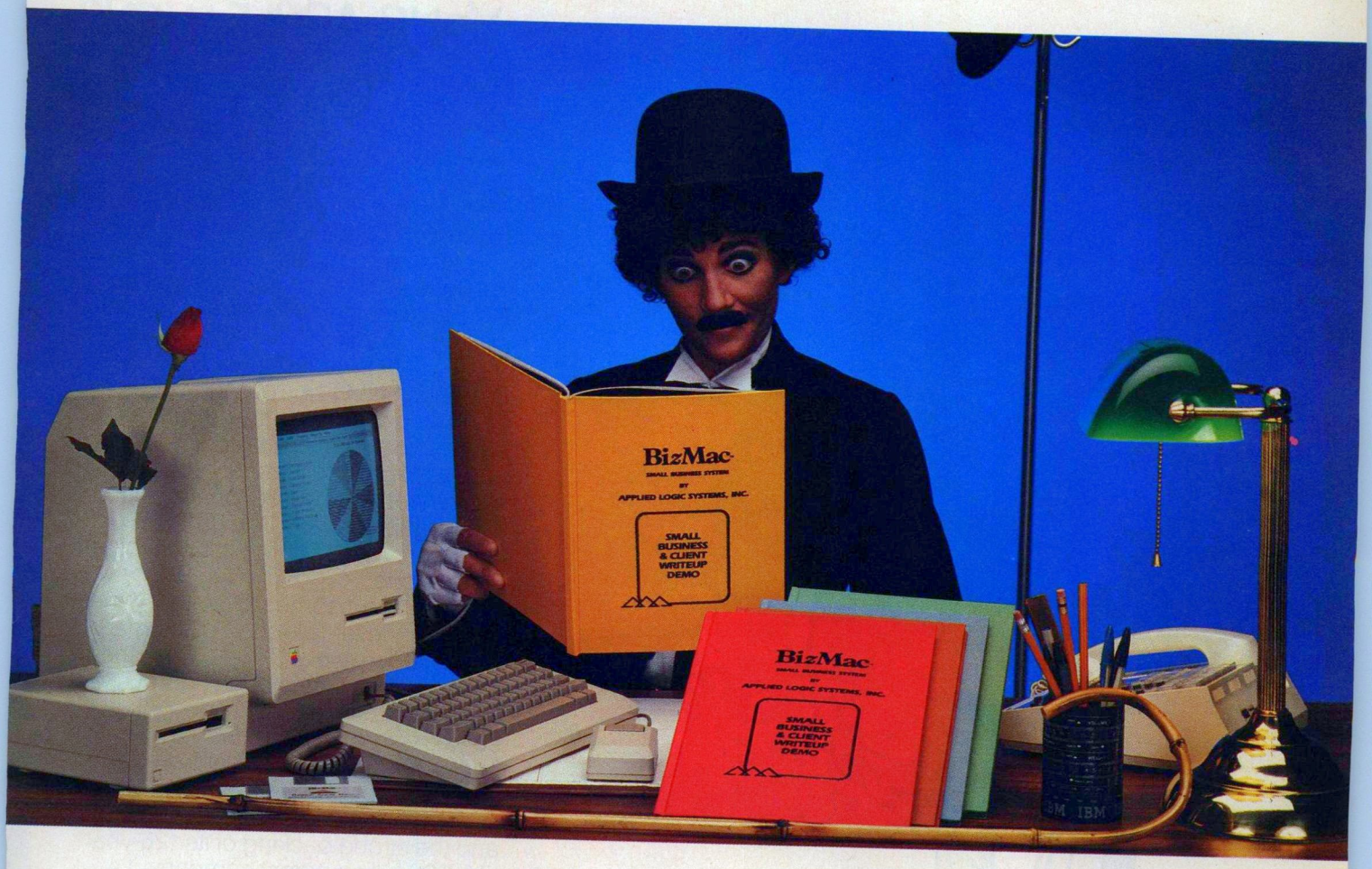

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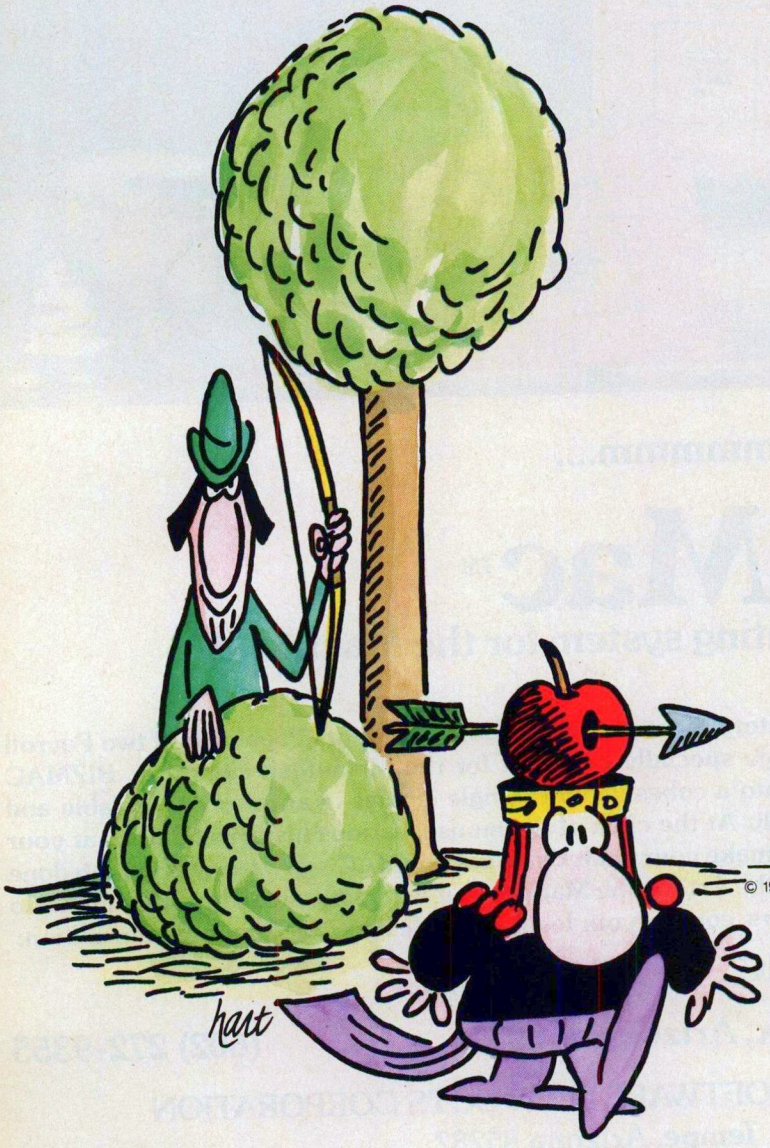

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PENNY-WISE PROGRAMS

PART II

In keeping with this month's theme of summer fun with your Apple, this second, and final, part of our look at public-domain programs for the Macintosh begins with an overview of games.

Macintosh programmers have contributed excellent games to the public domain. They range from arcade-style games to strategy games to old-fashioned board games, many of which rival commercial games in visual appeal and quality of play.

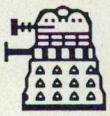
Arcade-game fans have several good choices. Missile Command by Robert P. Munafo is an enjoyable and relatively faithful rendition of the arcade classic of the same name (see figure 1). You aim and detonate aerial bombs with the mouse, and, although the game is fairly easy at first, progressive attack waves become more and more difficult to deal with, as is the case in the original.

For former Asteroids addicts, and for those too young to remember it, Megaroids by Mike and Mitch Bunnell is an excellent substitute. Floating in a black void is the familiar triangular spaceship (looking a bit like a folded paper airplane this time), while three-dimensional boulders careen past and enemy spaceships make an occasional appearance. Sound effects are much like those of the original (or my memory of the original), and, just as in the old days, ship control and gun firing are a four-button (or key, actually), two-handed affair that requires considerable skill and practice to master effectively.

One of the first (and still one of the most intellectually challenging) public-domain games is a combination strategy/arcade game, written by Johan Strandberg, called Daleks. The major objective of Daleks is, as with most arcade-style games, survival. This game differs from the usual arcade-style game, though, in that the action can be as slow or fast as you choose, and your major defense is a passive one: hiding behind the ash heaps of deceased enemy robots (the robots, or daleks, die primarily by colliding with other robots). Thus, in spite of the game's do-or-die appearance, its appeal is more for those of nimble minds than nimble fingers. (Caution: do not select About Daleks from the Apple menu—it doesn't explain how to play, and it does sometimes crash the program.)

Other public-domain games are entirely strategic. The most famous of these is Life, originally created by mathematician John Conway and popularized by Martin Gardner's columns in *Scientific American* in the 1970s. Life is a simple game with cells located on a graph-paper-like grid and three deceptively simple rules (which regulate the birth of new cells and the continued survival and death of existing cells in each generation). It

is, in fact, hardly a game at all, since it has only one player—the Mac—and hence no winners or losers, and no real end. Your only tasks are to set up the initial conditions (and you can usually skip even that step if you want, by having the program do the job for you) and then watch what happens. What makes Life fascinating, however, is its elegant and ever-changing demonstration of how exceedingly complex "universes" can arise from a small number of cells and a few simple rules. (For more information about the facts of Life and its many complexities, see *The Recursive Universe* by William Poundstone [Morrow, 1985].)



Daleks

Three versions of Life for the Macintosh are now in the public domain. The first to appear was Bill Atkinson's, and although it is the simplest of the three versions, it is probably the most enjoyable. It automatically displays succeeding generations at nine different speeds. If you have an analytical bent, you can step through the generations one at a time. With Auto Restart, the program starts over with a new random pattern, once the current progression reaches a stable, unchanging state. When you select Mutations, the program randomly inserts individual cells every few seconds to insert an element of unpredictability. If you combine Auto Restart and Mutations, the Mac screen will become a lively and never-ending microcosm (see figure 2).

Megaroids

Another version of Life, by Larry Hutchinson, is called LAZlife. It features three generational speeds and, more interestingly, three grid sizes. In the hi-res grid, each cell is the size of a single pixel, producing what must be the largest Life grid available on a personal computer. With such a large grid, you can watch complex Life forms that simply don't fit on smaller screens (see figure 3). The lack of a FatBits mode makes the precise choice of individual cells on the hi-res grid exceedingly difficult, however.

LAZLife

A third version, by Dennis C. De Mars, has only one grid size, one speed, and no random pattern generator, and is further limited in that you can't "paint" cells onto the grid but must turn each one on individually (with a click of the mouse). What it does do that the other versions cannot, however, is let you save and retrieve patterns of special interest—a useful feature for those with experimental inclinations. Also, De Mars has taken advantage of this feature by providing several files with some of the classic Life forms already entered and ready to roll (see figure 4).

Reversi

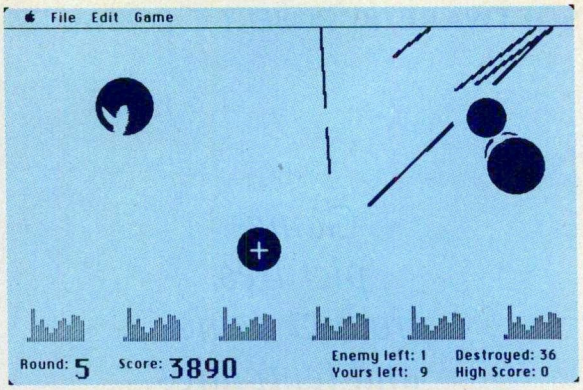


Figure 1: I may have been doing pretty well at the end of round 5 of Missile Command, but you should have seen what happened to me in round 6.

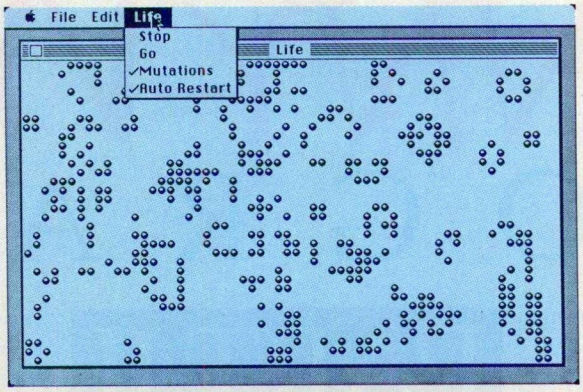


Figure 2: Bill Atkinson's game of Life has two options, Mutations and Auto Restart, which turn your Mac screen into a never-ending and ever-changing drama of life and death. This particular screen is a scene somewhere between the totally random (computer-generated) beginning and the final, somewhat stable "end."

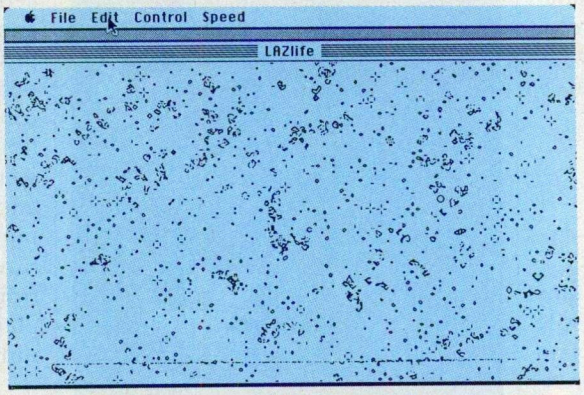
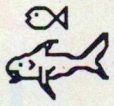


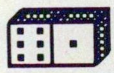
Figure 3: The hi-res screen of LAZlife is probably the largest (in terms of number of cells) on any microcomputer. This screen started as a random pattern generated by the computer. Now, after considerable evolution and a great many generations, eagle-eyed Life aficionados should be able to find many of the classic Life patterns.

Something's Fishy

The game of Wator is modeled on a situation more like real life than Life: the struggle between predators and their prey to survive. Designed by A.K. Dewdney and described in his "Computer Recreations" column in *Scientific American* (December 1984), Wator is a sophisticated ecological simulation of sharks and fish that also happens to be fun to play. The player determines the rules: the amount of time it takes fish and sharks to reproduce and how long it takes a shark that fails to find prey to die (the hapless small fish are at least given unlimited food supplies). The player also determines the initial number of sharks and fish (but not their position). Once these five conditions are determined, the program takes over, and it's shark eat fish.



Wator



Backgammon

Robert Martin has programmed Wator for the Macintosh and made it available on CompuServe. It comprises 12 files (plus 1 for the documentation) that take about 20 minutes to download at 1200 bps. (The reason for the large number of files is that Martin has conveniently divided his program into modules that demonstrate different aspects of programming in Aztec C—nonprogrammers, fortunately, can simply ignore this technicality. Once downloading is complete, you can simply convert the executable file WATOR.HCX with Binhex, put the remaining files away

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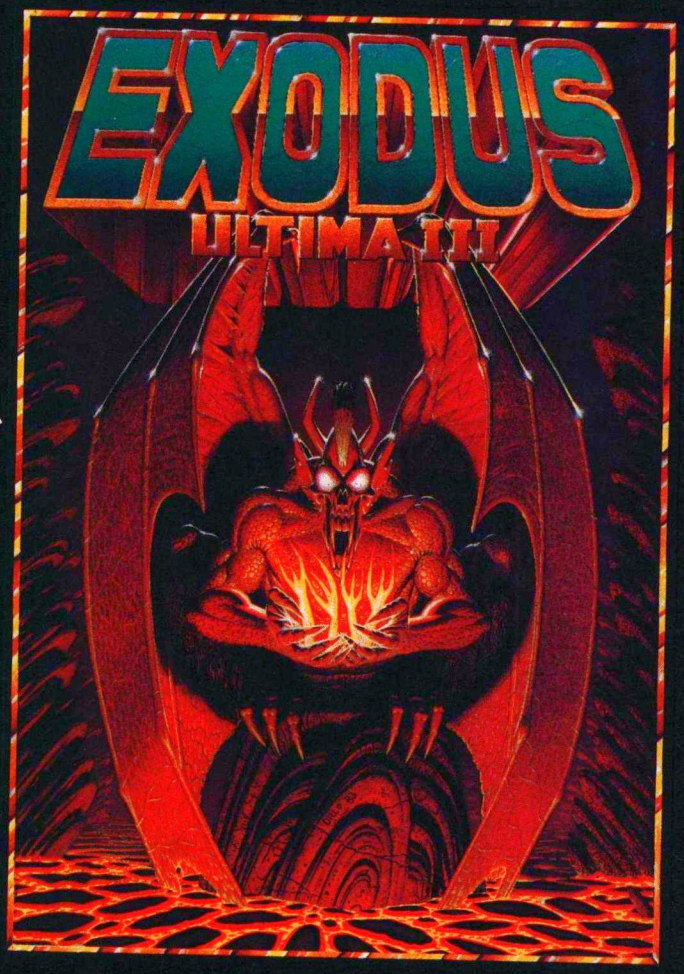

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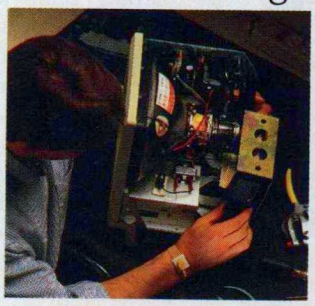

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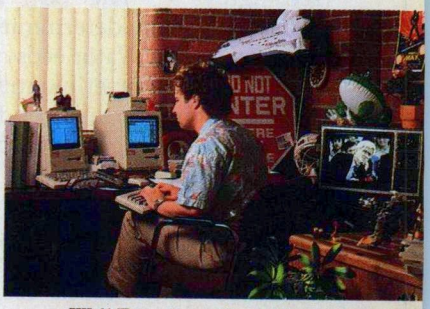

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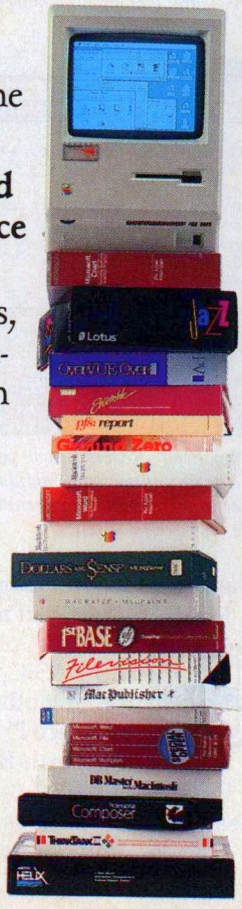

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in a folder, and double-click on the shark/fish icon of the converted file to start the program.)

Once you've established the five initial conditions, the program runs until you tell it to stop. Three windows keep you posted on what's happening: a graphic Wator universe, which is toroidal (i.e., opposite edges are actually contiguous), with fish in gray and sharks in black; a population graph, showing the numbers of each species over time; and a statistics box, which gives the current population sizes as well as the elapsed time, measured in arbitrary units called chronons (see figure 5). The fun, of course, comes in determining what makes the Wator ecosystem tick by experimenting with different starting conditions and watching (or betting on) what happens.

Board Games

Those who prefer to play against, rather than with, the computer, can choose from several classic board games available for the Mac. Two versions of Othello, or Reversi, are in the public domain. One, by Robert J. Woodhead, allows you to take back your last turn, save a game and reload it in midplay, and change the degree of sophistication (three levels for each of two parameters) with which the program analyzes its next move (see figure 6). The other, Iago, by David Reed, has three levels of play, three different playing-board sizes (the standard 8 squares by 8 squares, plus 10 by 10 and 12 by 12), a time clock for each player, and options that let you take back your last move or play back the entire game—this last feature is apparently for masochistic types who like to see their mistakes replayed (see figure 7). If you enjoy Backgammon, you should take a look at the three-dimensional version for the Mac, by Stephen D. Young and Debra Willrett (see figure 8). Other programmers have created a variety of board games that run under different programming languages. For example, you'll find a fiendishly difficult facsimile of Mastermind written by Shep Tamler in MS-BASIC 1.0., in addition to two versions of Go (one in MS-BASIC by George Acton, the other in MacForth by Bruce F. Webster) and a MacForth Roulette by Bob Fusco.

Iago

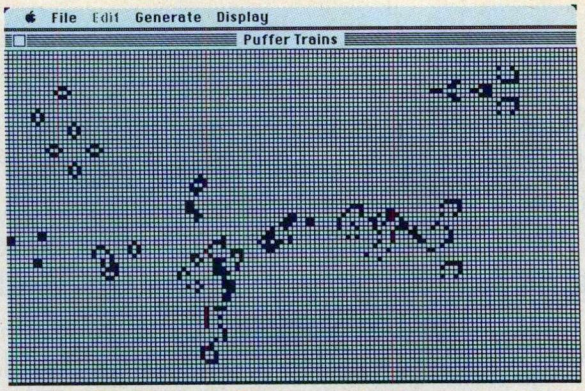


Figure 4: With Dennis de Mars' version of Life, you can make the grid visible and save and reload especially interesting Life forms. In this example, two Puffer Trains from one of de Mars' pattern files are chugging from left to right. The one on top leaves an evanescent exhaust, but the one on the bottom emits a long-lasting and constantly changing plume.

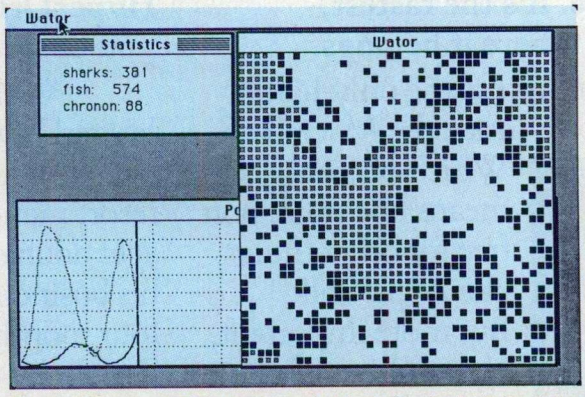


Figure 5: The game of Wator is a sophisticated ecological simulation of sharks and fish. The Wator Universe is to the right and its vital statistics and recent population history to the left. The fish in this example are clearly looking for a more stable relationship.

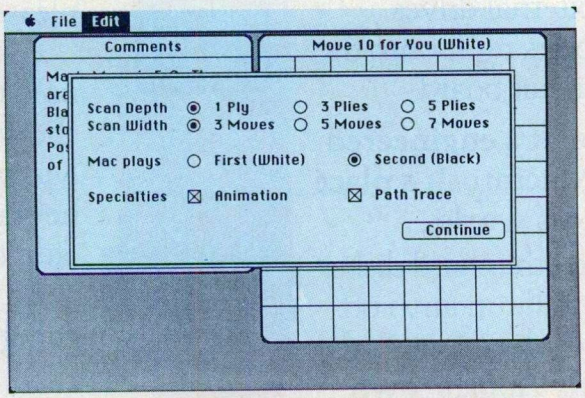


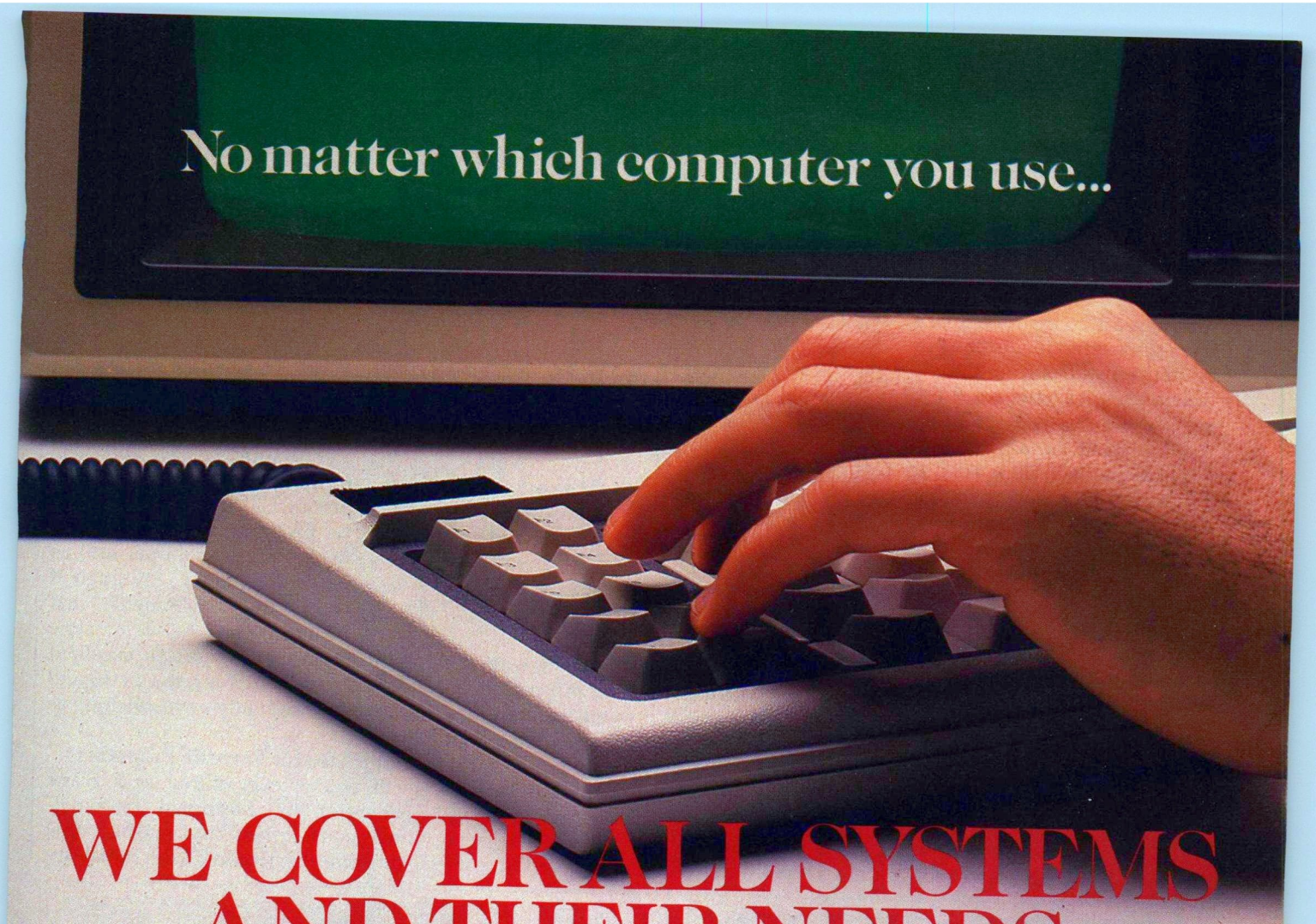
Figure 6: Woodhead's Reversi allows you to take back your last turn, or to save a game and reload it midplay. It also lets you elect the skill level of your computer opponent according to two different parameters.

Ready-made Pictures

If you find drawing with the mouse difficult, you'll be happy to know that the public domain is replete with other people's masterpieces. You can find a few examples of MacPaint pictures in the disk libraries of users' groups, but the greatest volume of electronic art is available on local bulletin-board services and on CompuServe. Renditions of insects and dinosaurs, Mickey Mouse and R2D2, Steve Jobs and (for some reason) an IBM PC are some examples. Just as in any art gallery, the quality of the work varies considerably, so be careful (and conservative) in your collecting.

Other, more productive, types of MacPaint files are those that help you with your own artwork. For example, you can get pattern collections by Gerald Blalock on three MacPaint documents, each containing 144 different patterns you can insert into your own MacPaint files by copying them with the Edit Pattern dialog box. For music-cassette collectors, Dave Eilers' cassette-label template takes the pain out of creating professional-looking labels that you can sandwich between the box and the existing cardboard insert. All you need to do is fill in the appropriate title and composer information with the text tool in MacPaint, print, cut and fold along the lines, and your cassettes will never have looked so good. Similarly, Bart Thomas and Paul Dobbs have created generic disk labels (for such things as utilities, MacWrite files, BASIC programs, MacPaint documents, and the like), with appropriate graphics on the front and titles on the spine and back. Just print them, cut them out, and paste them onto the disk.

Useful in quite a different way are pictures created by some of the new digitizers on the market. Often the subject matter does not lend itself to a great variety of uses (the picture of pop singer Madonna has limited potential, for example), but by downloading several images produced by different digitizers, you can get an idea of the differences between them.



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(On CompuServe, use the Key option of the Browse command in MAUG's Data Library 6 to find images created with a specific brand of digitizer.) Armed with this information, you can go out and buy the digitizer that creates images in the style and quality you prefer.

Similarly, many commercial Mac-clip-art manufacturers have discovered that examples of their wares placed in users'-group libraries and on BBSs are a useful, as well as informative, form of advertising. An example is a file from Cut 'n' Paste (made by Dreams of the Phoenix) that contains, among other images, a highly detailed old-fashioned steam engine.

Clip-art makers are not the only ones who have discovered the effectiveness of what amounts to free samples. Other companies have placed "crippled" versions of their products in the public domain for prospective customers to try out. One of the most fully featured of these is the MacMusic demo by Utopian Software. It contains all the features of the release version, except that you cannot save any of the music you create. The demo includes several previously transcribed and saved pieces (from the Beatles to Johann Strauss and John Philip Sousa) and a special music font that you have to install (in the System file) with the Font Mover to use the program.

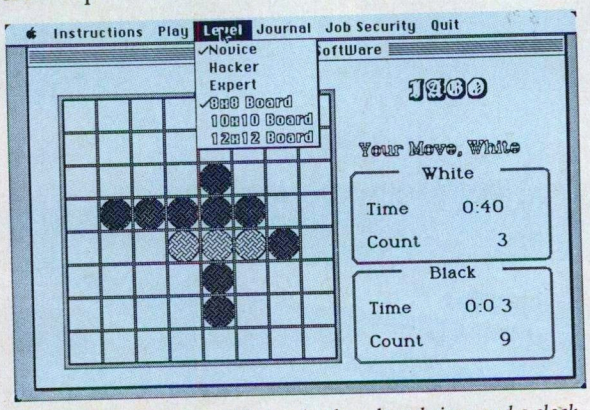

Figure 7: Iago has three skill levels, three board sizes, and a clock that always seems to cheat (from the human perspective, at any rate) in favor of the computer.

A demo that is as entertaining as it is informative is the Tumbling Mac program by Yves Lempereur. Its primary purpose is to illustrate the kind of sophisticated assembly-language programming that is possible with the Mainstay MacASM editor/macroassembler. Even if you don't know (or care) what that means, this small stand-alone program is quite impressive and fun to play with. A stick-figure drawing of the Mac tumbles through space in one of the screen's windows (see figure 9). You can alter the speed and direction of its sometimes dizzying gyrations by holding down the x, y, or z keys while simultaneously pressing + or − (to increase or decrease the rotation in each of the three axes).

Similarly, First Byte has created a sophisticated and self-running demonstration of its Smoothtalker speech-synthesis program and placed it in the public domain (as well as with its dealers). Although it lacks the excitement that comes with a hands-on-style demo program, it gives an excellent idea of what the program can do and is amusing and rather eye-catching as well.

Templates for Favorite Programs

If you've ever stared at a blank Filevision (or Multiplan or what-have-you) screen and wished that someone else would do the initial set-

CIRCLE 317 ON READER SERVICE CARD

up work for you, then you'll be glad to know that many templates for popular commercial programs are in the public domain.

The number of templates for business programs such as Multiplan are fairly limited: a home-budget template, a payroll template for a small business, a three-part template for calculating 1984 taxes that you can use as a model for creating a template for next year, and a few others. For more-stimulating and more-Macintosh-specific programs, however, a sizable library of public-domain templates has accumulated.

Filevision templates are not very common on CompuServe or other electronic bulletin boards, but you can find them in some abundance on disks from various sources. One such source is users' groups. Berkeley MUG, for example, distributes a disk devoted entirely to Filevision templates, including a periodic table of the elements.

It is no surprise, however, that the best source for Filevision templates is Telos Software itself. In return for a blank disk (or disks) and a self-addressed, stamped envelope, Telos will send you up to three disks of Filevision templates. They include everything from traditional filing exercises (using folders and file cabinets as the visual elements) to maps (sites for the 1984 Summer Olympics, the organization of the piano keyboard) to tree-structured relationships (family trees, corporate organization charts) to animated sequences and an adventure game that are simply for fun (see figure 10).

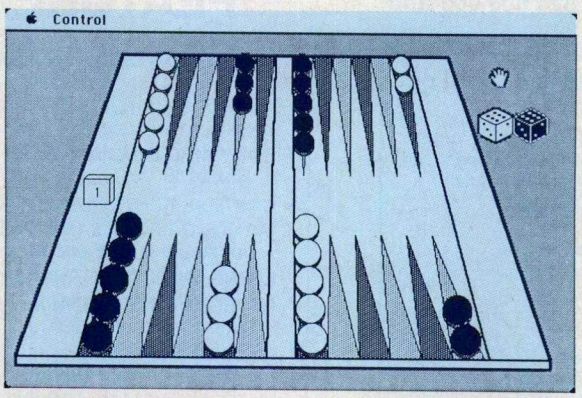

Figure 8: Backgammon has a three-dimensional board and uses a grabberlike hand to roll the dice and move the pieces.

The all-time champ for the number of templates in the public domain is MusicWorks. Indeed, for a while after its introduction, every other program on CompuServe seemed to be a MusicWorks score. Some are of dubious artistic merit (such as "Louie, Louie," transcribed by Todd Nix); others are well worth the cost of downloading (such as Bach's "Jesu, Joy of Man's Desiring," transcribed by Price Collins). One score in particular is notable for the quality of the music and the magnitude of the effort: Richard Rae's transcription of selections from Praetorius' *Ballet de la Royne*. Each selection is a separate file, because of MusicWork's file-size limitations, but with another public-domain program, Jukebox, by Jay Fenton (which can play as many as 32 MusicWorks files in sequence), you can string pieces together into an almost seamless performance. Rae, incidentally, has transcribed quite a lot of Renaissance music for MusicWorks and has several disks available by mail.

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▶ **Okidata** *ML 182 New 120CPS/LQ Mode/FRIC!/ Epson Graphics*	200.00*	*(4.34)*
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in your hands, dozens of new public-domain programs have become available. The cardinal rule of public-domain software is that there will always be more. Not all of it will be worth your while, of course, but if you are careful and discriminating in your explorations of the public domain, you are bound to turn up new and useful software constantly.

I need hardly add that although many people call this stuff "free software," if you download these programs from CompuServe or from an electronic bulletin board that requires a toll call, your bills for that on-line time will easily get out of hand. So no matter what transmission rate you're using, keep one eye on the clock (and one hand on your wallet) and learn to calculate download time—before you start the download—from the file size, which usually comes with the other file information.

Above all, don't forget the one thing that makes public-domain software so special—it always has a free trial period. If you are careful about the costs of acquisition, trying out a public-domain program should cost you next to nothing. If it does the job you need done, then you've saved yourself some money. If it doesn't, at least you'll have the satisfaction of knowing that you didn't spend more money than you had to. ✚

Robert Eckhardt recently resigned as vice president of Simon & Schuster's Electronic Publishing Group to devote more time to reading, writing, and being outdoors.

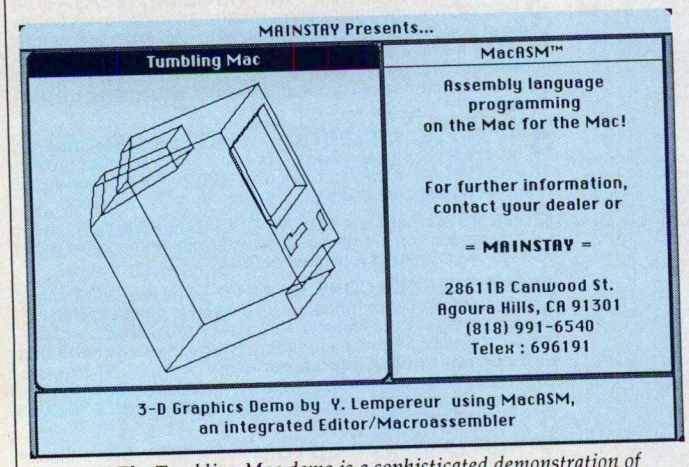

Figure 9: The Tumbling Mac demo is a sophisticated demonstration of three-dimensional Macintosh graphics.

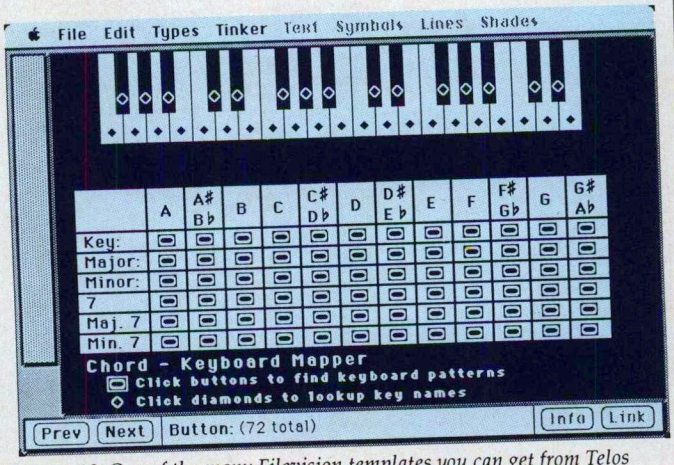

Figure 10: One of the many Filevision templates you can get from Telos Software is this piano-keyboard map.

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- MAUG's DL3 (NLIFE.HQX)

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- MAUG's DL3 (NULIFE.HQX, plus 14 other Life-form files locatable with the keyword Life)

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- MAUG's DL3 (STD.H, WATEVE.C, WATGRA.C, WATMEN.C, WATOPE.C, WATOR.C, WATOR.H, WATOR.HCX, WATOR.LNK, WATORU.C, WATPAR.C)

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- MAUG's DL4 (REVRSI.HEX, REVRSI.DOC)
- Club Mac BBS (REVERS.APL)
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- MAUG's DL4 (IAGO.HEX)
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- MAUG's DL4 (BACKGA.HCX)
- Club Mac BBS (BACGAM.APL)

Mastermind
- MAUG's DL3 (MASTER.BAS)
- Club Mac BBS (MSTMND.APL)

Go (MS-BASIC)
- MAUG's DL4 (GO.BAS, GORULE.TXT)
- NYMUG Disk #4

Go (MacForth)
- send $10 to Bruce F. Webster, 6215 Thorn Street, San Diego, CA 92115 (price includes copy of Roulette)

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MacPaint Patterns
- MAUG's DL3 (PATRNS.HCX, PATRN1.HCX, PATRN2.HCX)

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- MAUG's DL3 (TAPE2.HCX)

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- MAUG's DL3 (LABELS.HEX, LABEL1.HCX, LABEL2.HCX)

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- NYMUG Disk #4

MacMusic Demo
- MAUG's DL6 (MACMUS.HQX, MUSFN.HQX, plus music files you can locate with the keyword MacMusic)

Tumbling Mac Demo
- MAUG's DL4 (DEMO3D.HQX)

Smoothtalker Demo
- MAUG's DL4 (TALKER.HCX, PICTS.HCX)

Home Budget Template (Multiplan)
- Club Mac BBS (BUDGET.MMP)

Payroll Template (Multiplan)
- MAUG's DL3 (PAYROL.MP, PAYROL.DOC)

Income-Tax Template (Multiplan)
- MAUG's DL4 (TAX84.HQX, SCHEDA.HQX, SCHEDC.HQX, TAXES.DOC)

Filevision templates
- Berkeley MUG Disk #5
- Telos Software Products, 3420 Ocean Park Blvd., Santa Monica, CA 90405; (213) 450-2424
- Club Mac BBS (any file with the extension .FV)

"Louie, Louie" (MusicWorks)
- MAUG's DL6 (Louie.HCX)

"Jesu, Joy of Man's Desiring" (MusicWorks)
- MAUG's DL6 (BACH.147)

Praetorius, *Ballet de la Royne* (MusicWorks)
- MAUG's DL6 (BRNLE.HCX, 2BRNLE.HCX, BRNLEA.HCX, BRNLEB.HCX, BRNLED.HCX, BRNLEF.HCX, BRNLEG.HCX, BRNLEH.HCX, BRNLST.HCX, BRNDOC.HCX)

Jukebox
- MAUG's DL6 (MWJUKE.HCX, JUKEDO.TXT)

Renaissance music transcribed for MusicWorks (Richard Rae)
- Richard Rae, 1863 Centurion Parkway, Indianapolis, IN 46260

Note: these sources are provided to help you locate the software that interests you—they are not by any means the only places these programs can be found.

ORGANIZATIONS

New York MacUser's Group
P.O. Box 6686
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Berkeley Macintosh Users Group
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Semester membership: $15

Stanford Macintosh Users' Group
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Stanford, CA 94305
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The Public Domain Exchange
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San Jose, CA 95134
Complete Catalog: $2

HARDWARE/SOFTWARE/*BY SUE CRISSMAN*

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ThunderScan

"MacPaint for the rest of us." That's how Andy Hertzfeld, who wrote the the application software, describes ThunderScan, an ultrahigh-resolution digitizer for the Macintosh.

If you've been longing to have elaborate graphics on your Macintosh screen and you're one of those people who can't draw a straight line with a ruler, ThunderScan provides a solution. If you *can* draw, and you'd like to be able to transfer your artwork to a Macintosh screen, where you can change the brightness and contrast, enlarge or reduce the image size, and edit with MacPaint, you'll be interested in ThunderScan. You can work with images of photographs, forms, maps, charts, halftones, and illustrations; in fact, you can work with just about anything you can roll through your Imagewriter printer.

In anticipation of working with ThunderScan, I'd collected all sorts of things I thought I'd want to play around with. So, with my stack of pictures in hand, I opened the ThunderScan box. ThunderScan consists of an optical-scanning cartridge, including a cable with an adapter box to connect the cartridge to your Macintosh; the software to make it all work; and, of course, a users' manual. The most unusual item is the digitizer cartridge or scanner, which resembles a cross between an Imagewriter ribbon cartridge and a hand-held price-tag scanner such as ones you may have seen in department stores.

From Setup to Scanning

Because I was looking at a piece of hardware, I decided to read the manual for a change, rather than just forging ahead. When I read manuals, I usually plow through them until I get bored or till I no longer understand what they're talking about—anywhere from 2 to 20 pages. The ThunderScan manual is 60 pages long and is liberally sprinkled with photos and graphics. I ended up reading the entire manual before I began—a first for me, and a statement about the quality of the documentation. When I later referred to the manual for specifics, I found what I wanted quickly and easily. This documentation is some of

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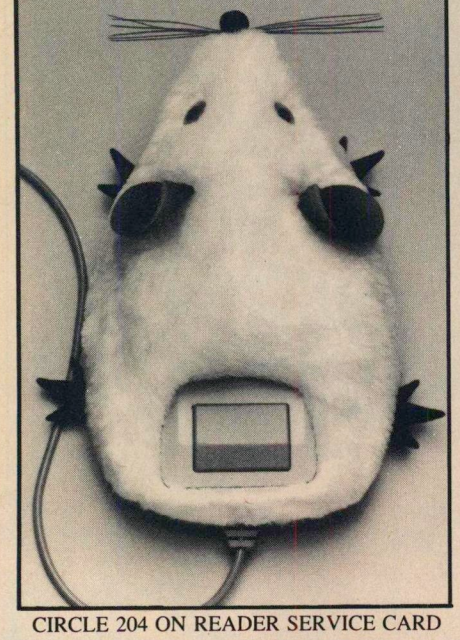

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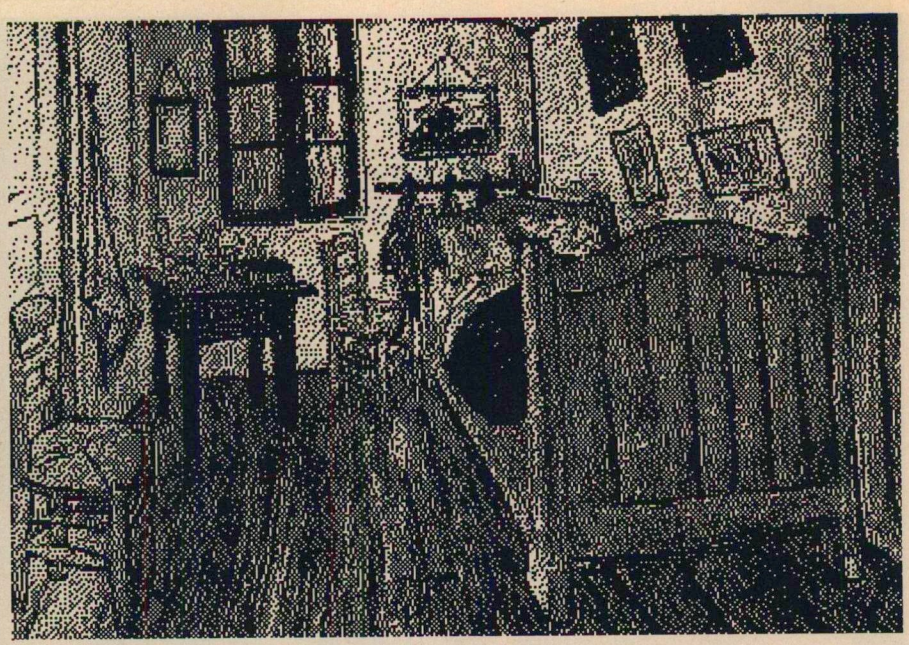


Figure 1: ThunderScan image of Van Gogh's 'Room at Arles'

the best I've seen for the Mac.

Installation requires only a screwdriver. You attach the adapter box to the printer socket on the back of your Mac and then plug the Imagewriter cable into the socket on the adapter box. The box contains a switch that enables you to change from scanning to printing. The ThunderScan software also contains a split-port option, so you can leave the Imagewriter connected to the printer socket and connect the adapter box to the modem socket if you wish. Before installing the scanner cartridge, check the DIP-switch settings of the Imagewriter. ThunderScan includes a notice telling you about these switches, but you might easily overlook it.

To install the digitizer cartridge, you remove the ribbon and snap the cartridge in its place; ThunderScan provides a special plastic printer cover to use while scanning. After you've installed the scanner and adapter box, your Imagewriter has, in effect, become an "image reader" that scans pictures as they feed through it. The scanner moves back and forth across the page, translating each point it sees into a dot corresponding to one of 32 shades of gray. Although your Macintosh can show only black or white dots, the ThunderScan "gray map" figures out exactly which dots to include in order to represent the image you're scanning. After you have scanned the image, you can work with the gray map and change the contrast and brightness to enhance the picture and produce a final image that is exactly what you want.

Once you've installed the hardware and booted the software, you're ready to scan images. ThunderScan provides a sample image and a tutorial to help you learn the basics. You first focus the scanner by positioning it over a white area to be scanned, choosing a command from a menu, and then adjusting the knob on the scanner until a maximum number appears on your screen.

To scan your image, you choose Scan from the Scanner menu. Doing so brings up the Page Map dialog box, which allows you to select the area of your document you wish to scan and choose whether to reduce or enlarge it or leave it in its original size. Depending on the amount of memory available in the computer, you can enlarge an image up to 400% or reduce it to 25% of its original size.

Clicking on New Scan begins the scanning process. You can save the image as a ThunderScan document, complete with gray-map information, or as a MacPaint document. At this point, you can enhance, edit, or print the image. Actual scan time depends on the size of the image being scanned. Setting up the system and creating my first image took me less than an hour.

Once the image has been scanned, you can use ThunderScan to fine-tune the final product. In addition to

contrast and brightness adjustments, you'll see a tool palette with a pencil, eraser, selection rectangle, and hand symbol (sometimes known as the grabber), which generally work the way they do in MacPaint.

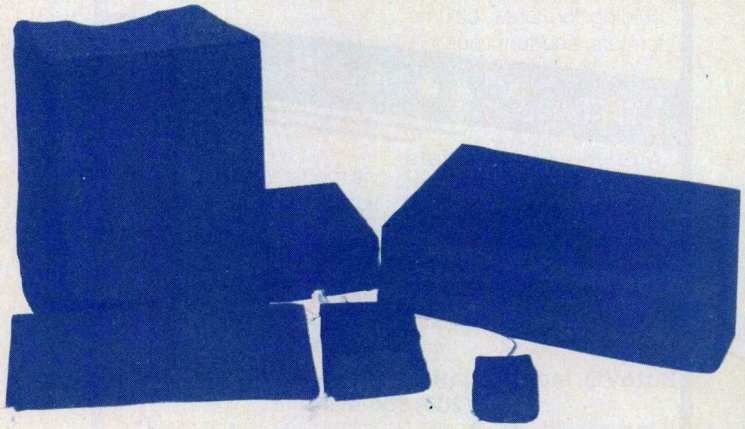
ThunderScan has an added feature called auto-scrolling. When you want to move your document around on the screen, you press the mouse button; push the hand a little; and, while it's still moving, release the mouse button. The image continues to move until you click the mouse button again. This procedure is a vast improvement over the constant dragging you need to do to get the same effect in MacPaint. Auto-scrolling even has two speeds, so you can move slowly or quickly across parts of your image. With the selection rectangle, you select parts of the image to work with; you can also use the Select All command from the Edit menu. The pencil and eraser work as you expect them to, and there is a Fat-Bits command as well.

With ThunderScan you can adjust the halftone of the images you have scanned. When Thunderscan scans an image, it produces a halftone that shows a smooth transition from the black areas to the white areas of the image. If you don't know the difference between a halftone and a quarter note, you can easily get a sense of what it's all about by selecting areas of your image and changing the brightness and contrast settings on the screen. Once you've selected an area and set the contrast and/or brightness settings, you choose Halftone from the Scanner menu to see the results. If the image is too dark or too light, adjust the brightness control. Adjusting the contrast control varies the difference between light and dark in the image. The High Contrast command lets you produce stark black-and-white images with little gray in them, the Invert command lets you change all the black dots in your image to white, and vice versa.

ThunderScan's Cut, Copy, and Paste commands are similar to the same commands in MacPaint, with an additional feature. You can enlarge or shrink the size of the image you're copying by selecting an area for pasting that is larger or smaller than the original part of the image you copied. The new image will be sized to conform to the size of the rectangle you draw to receive it. To paste an image in its original size, you simply click at the destination of the upper-left corner of the pasted image.

Creating my first image took me less than an hour.

ThunderScan is called an ultra-high-resolution program because of the amount of information it can encode about a picture. Documents are digitized to resolutions exceeding 200 dots per inch, with 32 levels of gray scale. Although this amount of information is more than your Imagewriter printer can deal with, the Apple LaserWriter printer will be able to print your documents with this degree of resolution, giving you extremely-high-quality representations. The original version of ThunderScan does not work with the LaserWriter, but a revision is on the way that will allow you to print images you've previously scanned with the Imagewriter, directly to the LaserWriter.



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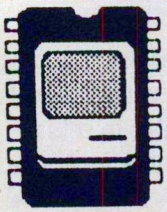

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The new version will contain some other minor changes and will be available to current owners of the program at a nominal fee.

ThunderScan's level of precision actually can make life harder for a novice. When I attempted to make an image of a map, ThunderScan was so sensitive that it even picked up wrinkles and translated them into gray patterns. I also had problems working with a postcard and a Polaroid photo. Although you get a special plastic "carrier" sheet that you can tape a small picture to, the pictures didn't feed through the Imagewriter as well as I had anticipated.

If you do try to scan things that are too thick, you may have problems. If you're in the habit of unjamming your printer paper while you're printing, do *not* try to help thick objects feed through the Imagewriter while you're scanning. I moved the roller shaft (it used to be called a "paper bail") back while scanning; the result was a disheartening crunch as the scanner ran into the roller shaft and scanning stopped. Fortunately, neither the software nor the hardware suffered permanent damage.

Even if you can feed a thicker object through properly, you may have problems with the results being too dark. The message is clear; when the Thunderware people say your image must be flat, they mean *flat*. You'll have to make a photocopy of anything thicker than a sheet of paper. In the process, of course, you'll lose some of the resolution quality.

ThunderScan also takes a lot of memory and disk space. If you're working with a 128K Macintosh and a single disk drive, the size of what you'll be able to scan is quite limited. You can work with an 8 × 10-inch image by reducing the magnification to 86%. Don't expect to be able to enlarge a drawing that size by 400%, though. Of course, working with a document four times the size of an average sheet of paper is difficult, given the size of the Mac screen and the limits of the Imagewriter.

Because ThunderScan writes information to disk when you run out of memory, you'll want to follow the tips in the manual for customizing your disks to make the best use of space. With a 128K Macintosh, for

example, you should put the system folder on a disk in the internal drive and the ThunderScan application on a disk in the external drive.

Format First

Speaking of disks and drives, I tried to save a scanned image onto an unformatted disk I inserted in the external drive after I had been working with ThunderScan in the internal drive. I'd already received a message about not having enough disk space, so I expected to save the image on a new disk. Instead of asking me if I wanted to initialize the disk, the program told me: AN INPUT/OUTPUT ERROR HAS OCCURRED. Since I didn't have enough room on my application disk, I was unable to save the image as a ThunderScan document. I was able to save it as a MacPaint document, however, but I lost all the gray-shade information. Once you've experienced this problem, you'll remember to keep a properly initialized disk around when you're using ThunderScan.

Scanning is an easy process, but it can be time-consuming. Because of the quantity of information ThunderScan can encode, scanning a large image can take as long as half an hour. To speed up the process, you can choose to scan bidirectionally—you'll lose a bit of resolution but save some time. If you wish, you can scan images without keeping the gray-shade information. This technique speeds up the process, but you won't be able to change the contrast or brightness. The features that give ThunderScan its ultrahigh resolution are what make it work more slowly than you might like. If you want to give up some of the special features, you can work faster, but if you want a higher-quality image, it will take longer. The resolution ThunderScan provides is extremely high, and you'll probably find the extra time investment worthwhile.

What makes ThunderScan unique is the quality of the images you can produce and the ease of producing them. If you just want to copy images without all the extras, you can do that, but ThunderScan really shines when you adjust the gray-shade information. You can create your own high-quality clip art, paste illustrations into reports, and copy photographs (as long as they're thin and flat). ThunderScan would be invaluable in producing newsletters, and you could also use it to make high-quality overhead projection art.

Other digitizers allow you to capture different kinds of images, some by using a camera or video camera. I'll review several of them next month. If your primary interest is recreating flat pictures with ultrahigh resolution, ThunderScan is the product for you. Especially in combination with a LaserWriter printer, it will give you the highest-quality graphics possible with a Macintosh. ✚

Sue Crissman is a Bay Area writer and consultant and a contributing editor to A+. Her consulting clients include Apple and other computer companies, for whom she designs and writes training, sales, and promotional materials.

PRODUCT INFORMATION

ThunderScan
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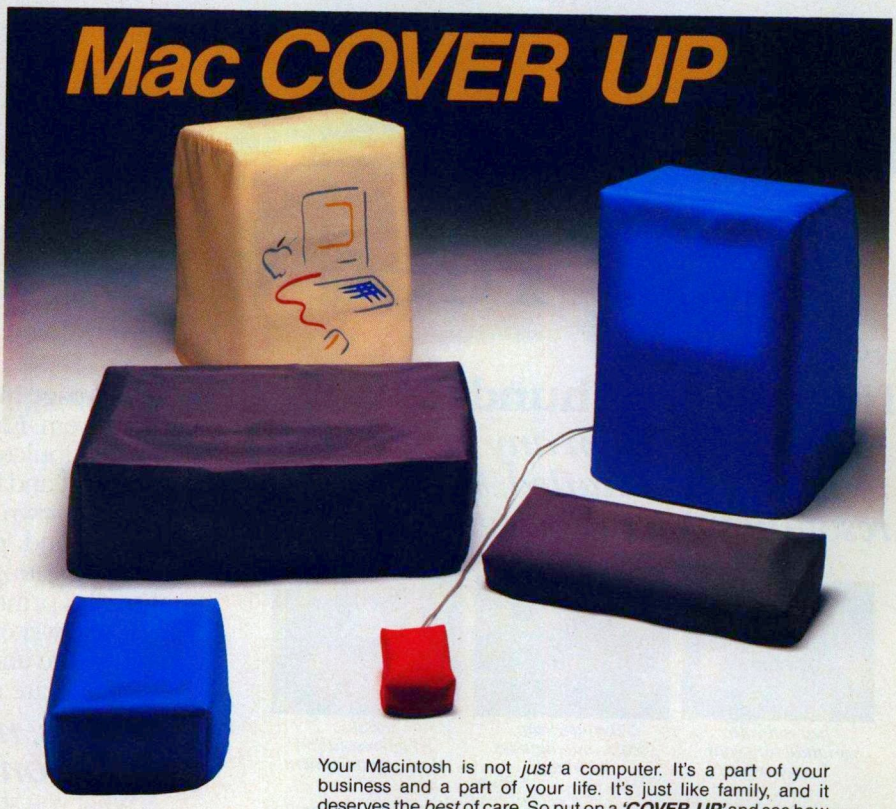

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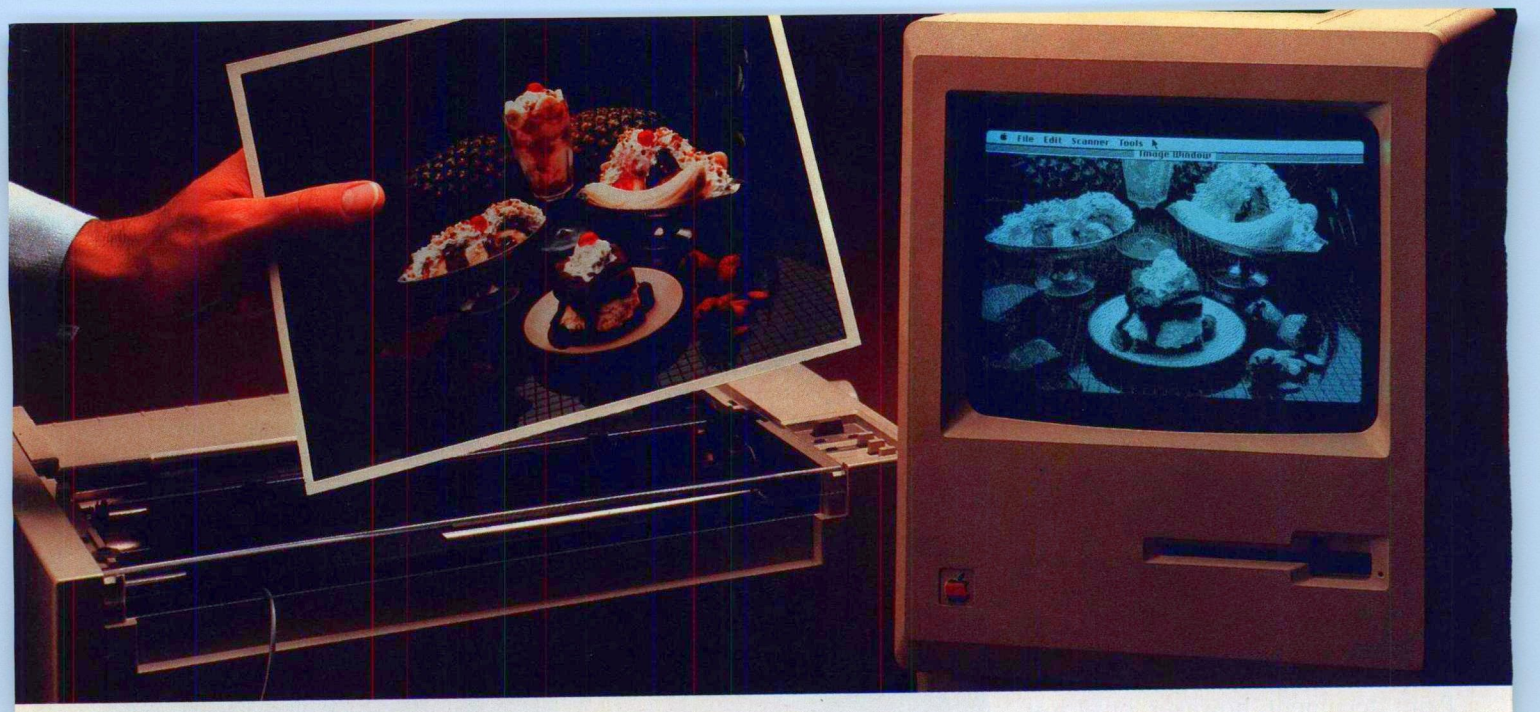

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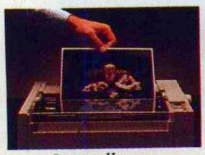
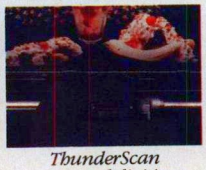


Just roll your original into your Imagewriter.



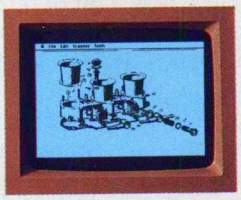
ThunderScan scans and digitizes the image.

Presto! A high-resolution MacPaint document.

No doubt about it, Macintosh is one great graphics machine. But until now, Mac graphics have been limited to what you can draw with a mouse and what someone else has put on a disk. Consequently, taking full advantage of Mac's graphics capabilities has been tough. But now there's ThunderScan. The new optical scanning device that lets you feed your Mac a steady diet of graphics that are useful to you.

ThunderScan turns Mac's Imagewriter printer into an image reader. So you can digitize any printed image and turn it into a detailed, high-resolution MacPaint document. Anything, including forms, half-tones, photos, mechanical drawings, maps, floorplans, logos, signatures and more. From black and white and color originals. ThunderScan reproduces them at over 200 dots per inch and in 32 shades of gray.

ThunderScan's application software, written by Mac-team-member, Andy Hertzfeld, makes it an extremely versatile and useful tool. You can generate full-page images or selected parts of them. Enlarge and reduce them. Manipulate them. Control the contrast and brightness. Create your own personal image disk. "Cut" and "paste" images together, creating new documents. And print them out on your Imagewriter. Or send them by modem to another Mac. The possibilities are nearly endless.



No lights, no camera, just action.

What you see here is the complete ThunderScan system. You don't have to buy an expensive video camera. Just pop out your Imagewriter's ribbon cartridge, snap in ThunderScan and you're set. It can even work in the dark (maybe you can think of an application for that).

If you bought a Mac at least partly for its graphics, only to find you couldn't take full advantage of them, now you can. With ThunderScan.

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ThunderScan

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MacTips

Suggestions from our readers

MAXIMIZING MACPAINT

The following excerpts and tips about how to get more out of MacPaint are from a talk by Apple's Bill Atkinson, programmer of MacPaint, at the MacWorld Exposition in San Francisco (February 1985). Many of these tips explain techniques in the Shortcuts Help screen from the Goodies menu (see figure 1).

Undo

The top left key, the tilde, undoes your last action, as does Control-Z. If you hold down the Undo key continuously, you can get an animation effect.

Clear

The top right key, the Backspace key, clears whatever is in the selection rectangle or lasso.

Multiple-Key-Combination Rule

Press and hold down the desired special keys, hold the mouse button down, initiate the mouse motion, let go of the keys, and move the mouse with the button held down until you are done. Once the mouse starts moving, it knows what it is going to do, so you can release the special keys.

Constrain

You use the Shift key to limit tool movement to horizontal, vertical, or 45° lines with the \ _ or _ and circles with the oval tool. This technique is useful with the following tools: Eraser, Brush, FatBits, Spray Paint, Scroll, Show Page, Select, and Drag.

Multiple Copy

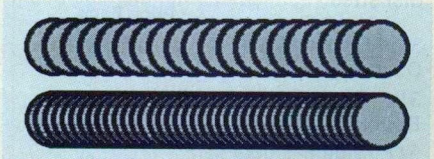
After defining the image you wish to copy, with the box or lasso selection tools, press the Option and ⌘ keys. Then hold down the mouse button, initiate mouse motion, let go of the keys, and move the mouse to get multiple copies.

Multiple-Copy Spacing

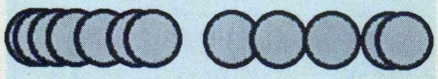
Rapidly moving the mouse produces unevenly spaced copies of a selected image, but moving the mouse slowly produces evenly spaced ones. Select a line width from the Line Width box to determine the space between copies. For instance, to make a curved, dashed line, lasso a single dot, hold down the option and ⌘ keys, and select a line width to control the spacing of the dashed pattern (see figures 2 and 3).

Three-Finger Stretch

To constrain multiple copies, hold down the Shift key, the Option key, and the ⌘ key. This stretches or shrinks shapes you've outlined with the selection tools or lasso. (You don't have to remember which special keys to use because you employ all of them.) To maintain a pattern when stretching an image, use the Grid option in the Goodies menu (see figure 4).



Even spacing occurs by the width selected in thickness box and slow movement of the mouse while using the multiple copy technique.



Uneven spacing occurs with rapid movement of the mouse while using the multiple copy technique.

Figure 2: Examples of using the Multiple Copies technique

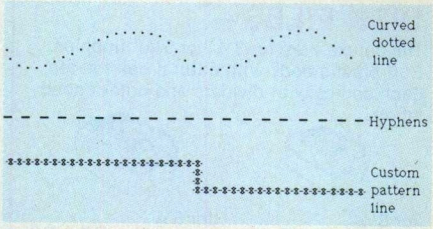


Figure 3: Using the Multiple Copies technique to achieve different spacing effects

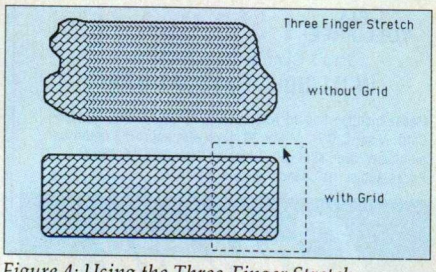


Figure 4: Using the Three-Finger Stretch technique with the Grid option selected maintains the patterns within the stretched image.

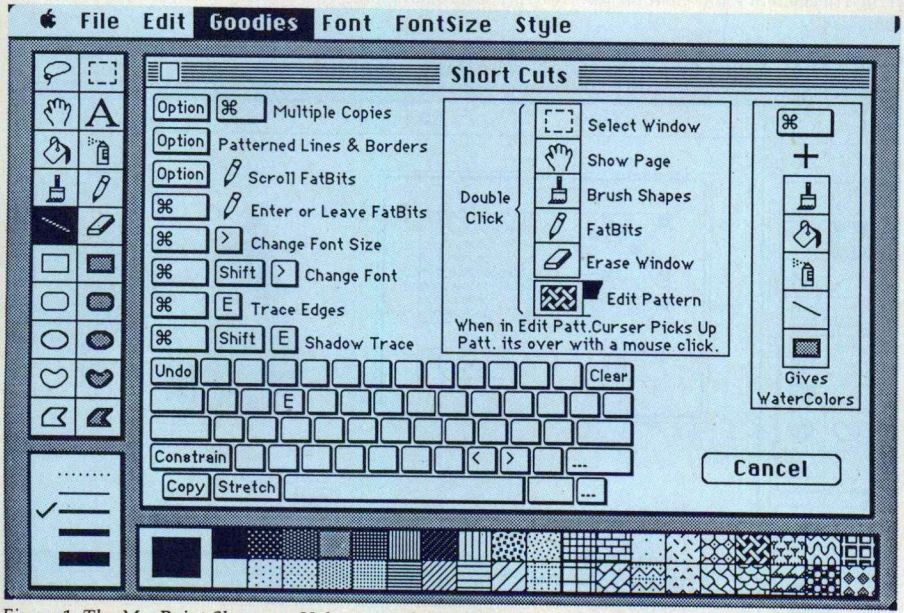
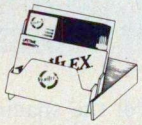


Figure 1: The MacPaint Shortcuts Help screen from the Goodies menu. Note the addition of the Gives Watercolors box. You can find this modified Help screen in the MAUG section of CompuServe or through users' groups and add it to your MacPaint program.

VERIFLEX



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CIRCLE 291 ON READER SERVICE CARD

MacTips

Transparent Paint

If you hold down the ⌘ key while painting, you'll get effects such as those in figure 5.

MACPAINT SHORTCUTS

Entry to and Exit from FatBits

With the Pencil tool selected, hold down the ⌘ key. If you do not make any marks but press the mouse button, you will jump into and out of FatBits at the location of the pencil point.

If you hold down the Option key, the cursor will temporarily convert into the hand so you can scroll. Release the Option key, and you can edit with the pencil, press the Option key again and scroll, and so on. This technique is handy because FatBits is so magnified and has such a narrow field of view that reaching almost anything you want to edit requires a little bit of scrolling.

Incomplete Lasso

When you select an image with the lasso but do not complete the lasso, MacPaint connects the ends with a straight line.

Stretching/Shrinking

You can stretch or shrink an image outlined by a selection rectangle by holding down the ⌘ key and pressing the mouse button while the pointer is on one of the flashing edges of the rectangle. If you grab the image in the middle of an edge, you can stretch it only in the direction of the edge, but if you grab the image near a corner, you can stretch it in any direction. You can also stretch or shrink an image by pasting an image into a large

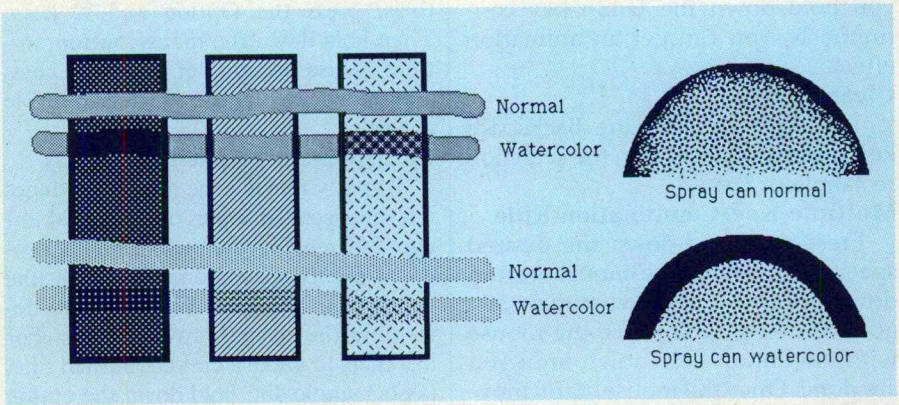


Figure 5: If you hold down the ⌘ key while painting, you will get a watercolor effect (above left). This use of the Transparent Paint mode (above, right) prevents overlapping onto a border when you paint with the spray can.

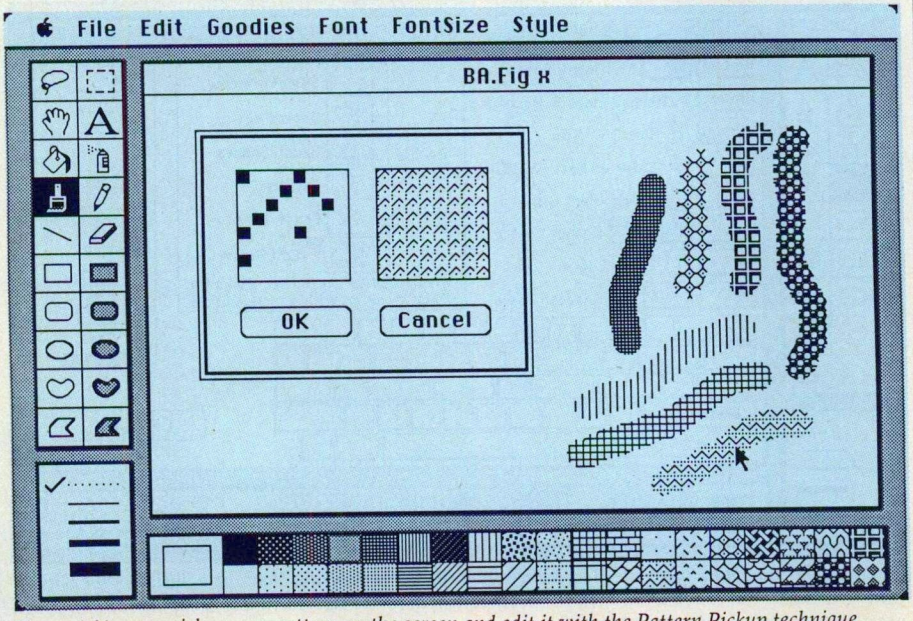
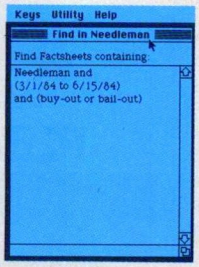


Figure 6: You can pick up any pattern on the screen and edit it with the Pattern Pickup technique.

It's easy with Factfinder.™ Because Factfinder is a kind of electronic "desk-drawer" where you can just toss information without worrying about how it should be arranged or how you might want to use it. There are no fields to define, no formats to set up.

When you need to find all the clients you have who hate olives or live in Denver; when you want to collect your notes on pasta merchandising; when you need the name and number of that guy who's looking for leveraged buyouts, it's yours in a few seconds, at your index fingertip.



You just key in your notes on the Needleman Plan (or Needleman vs. Nardoff or the Needleman Noodles campaign) in any length you want, and click the mouse on a few key words—"fallout," "bail out," "roll-out," "leveraged buyout," whatever.

Then, any of those words or part of those words will bring you a stack of notes you've made that include "Needleman," or "leveraged buyouts," "national rollouts" or miracle "bail-outs." Or you can request Factfinder to get you the Factsheet that contains "Needleman" *and* "bail-out." Or you can ask for anything that mentions "bail-out" *or* "Needleman."

And Factfinder has all kinds of features like zoom and automatic wrap to help you manipulate the heck out of your data, and make it whatever size and shape you want.

Contact your Macintosh™ software dealer, or call 1 800 MACWARE to find out where you can get Factfinder.

From Forethought, Inc.

MACWARE™

CIRCLE 127 ON READER SERVICE CARD

How to find a Needleman in a haystack.

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or small selection box.

Constrain Stretching/Shrinking

Holding down the Shift key while stretching or shrinking an image maintains the same aspect ratio.

Pattern Pickup

While the Edit Pattern window is on the screen, move the cursor to any point on the screen outside the window and click the mouse button, which will pick up whatever is at that point (see figure 6). Instead of going into FatBits, carefully looking at a pattern, and writing it down or dumping it onto the disk or printer, you can use this little-known feature. All patterns you create or pick up are also saved with the document.

Changing Font Features

⌘>, or ⌘<, increases or decreases text-font sizes. To change the font itself, use ⌘Shift >, or ⌘Shift <,. To change font sizes or styles within a single line of text, you can press Enter wherever you want the change and then make the change and continue typing.

OTHER TRICKS

Pattern Borders

If you hold down the Option key, any line or border you draw will come out in the pattern that you've selected.

Trace Edges

To make a box with a shadow, draw a borderless box filled with black. Grab the image with the selection rectangle and then press Shift ⌘E. The box turns white and the edges black, while the right and bottom edges are shadowed with an extra line of dots. Also try printing your name with the spray can or thick pencil. Grab the image with the selection rectangle and press ⌘E (see figure 7, below).

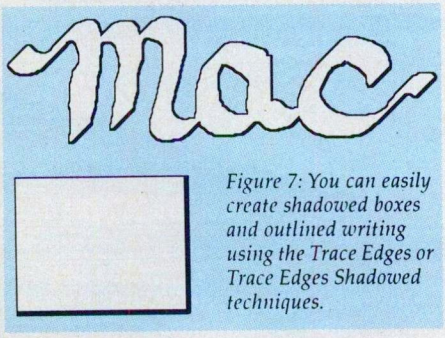

Figure 7: You can easily create shadowed boxes and outlined writing using the Trace Edges or Trace Edges Shadowed techniques.

FatBits Sizing

Nine dots in FatBits equals 1/8 inch (72 dots/inch).

Quick Eject and Reset

If you hold down the ⌘ key while selecting Quit from the File menu, the disk ejects, and the computer restarts. +

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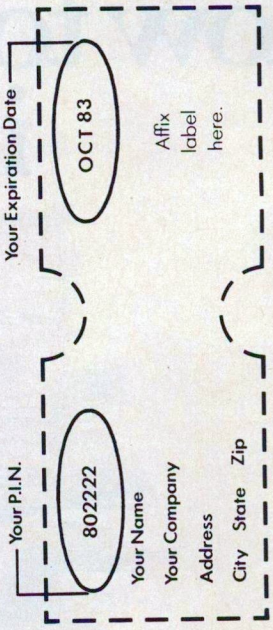

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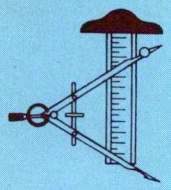

Introducing idd's

MacDraft™

The Ultimate Drawing Package for the Macintosh™

MacDraft™ is the most powerful object oriented drawing tool available for the Macintosh™ today. Its ease of use, combined with its powerful capabilities, allows even the most casual user to produce professional looking drawings. The versatility of MacDraft™ makes it ideal for the beginner, as well as the professional.

Although MacDraft™ is powerful enough to create scaled drawings, schematic diagrams, organizational charts and business illustrations, it is also ideally suited for creating general sketches, greeting cards, and almost any other picture that you might want to draw.

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- Continuous drawing mode.
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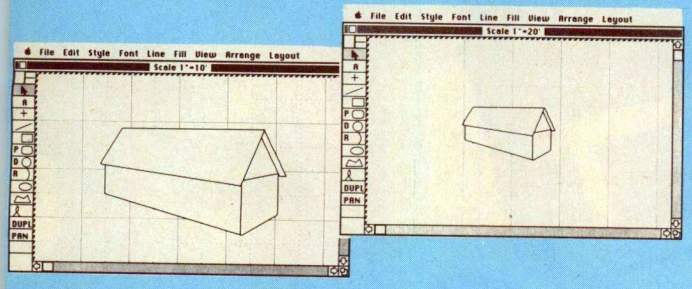
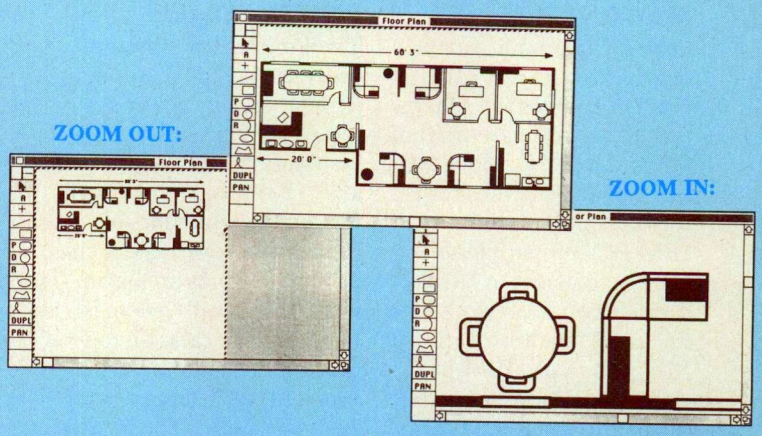
- Paste pictures from MacPaint™.
- 64 Patterns for Fill & Ink.
- Flip objects.

MacDraft™ offers 16 different scales to suit your needs.



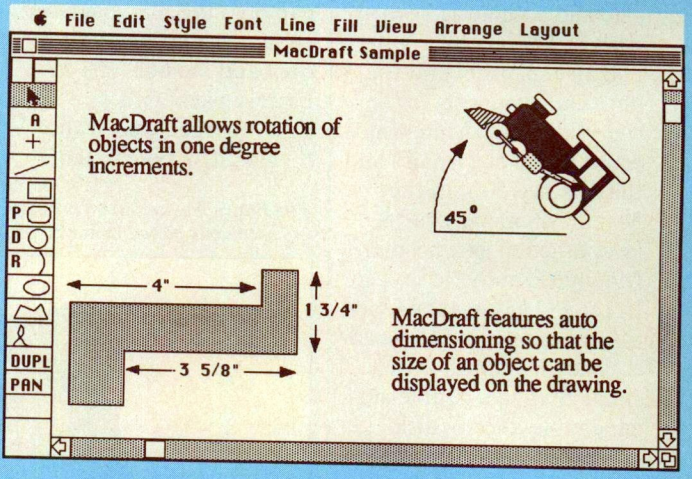
Objects created at one scale, can be pasted into a drawing at a different scale. The objects will reduce or enlarge to conform to the new scale. You may also change the scale of the entire drawing.



The Zoom functions allow you to see either a reduced or enlarged view of the drawing. Regardless of the view, you still have full access to all of the drawing capabilities of MacDraft™.

ZOOM OUT: to see your entire drawing, and also add large objects that may stretch beyond a normal view.

ZOOM IN: to add fine details to your drawing that may not be convenient to create at a normal view.



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idd inc.

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A+ pipeline

MAC

▸ MACCHARLIE AND MACCHARLIE PLUS

Dayna Communications' new hardware/software product enables the Macintosh to use software written for the IBM PC. MacCharlie permits Macintosh users to access the large library of IBM PC-compatible software, to connect to IBM serial networks, to exchange PC and Macintosh data files, and to use IBM peripheral devices such as letter-quality printers. It also serves as a printer buffer to the Macintosh.

MacCharlie functions as a coprocessing device. It consists of two primary components: a keyboard extension that contains ten function keys on the left side and a numeric keypad with 18 keys on the right; and an expansion unit that physically connects to the right side of the Mac, which contains the electronics and the disk drive(s). In the Macintosh mode, the 18 keys function as a normal Macintosh numeric keypad. In the PC mode, they function as a numeric entry pad.

The unit comes with a single 5¼-inch, double-sided, double-density disk drive with 360K of storage and 256K of random-access memory. Also available is an expanded version, MacCharlie Plus, with 640K RAM and two disk drives. *(List Price: 256K version, $1195; 640K version, $1895)*

Requires: Macintosh

Dayna Communications
50 South Main Street
Suite 530
Salt Lake City, UT 84144
(801) 531-0600

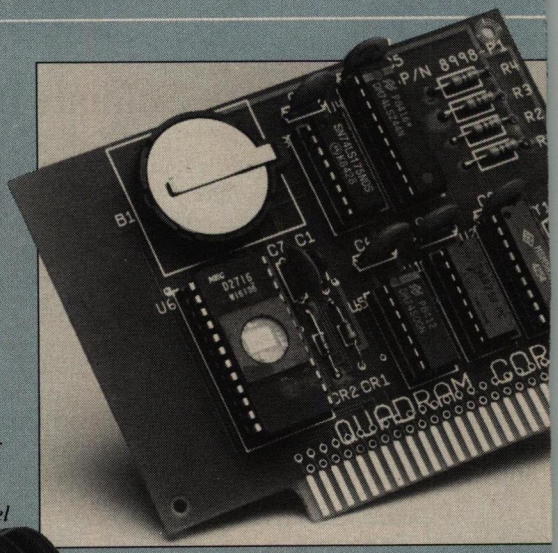
CIRCLE READER SERVICE NO. **540**

II SERIES

▸ PRAIRIE POWER SYSTEM

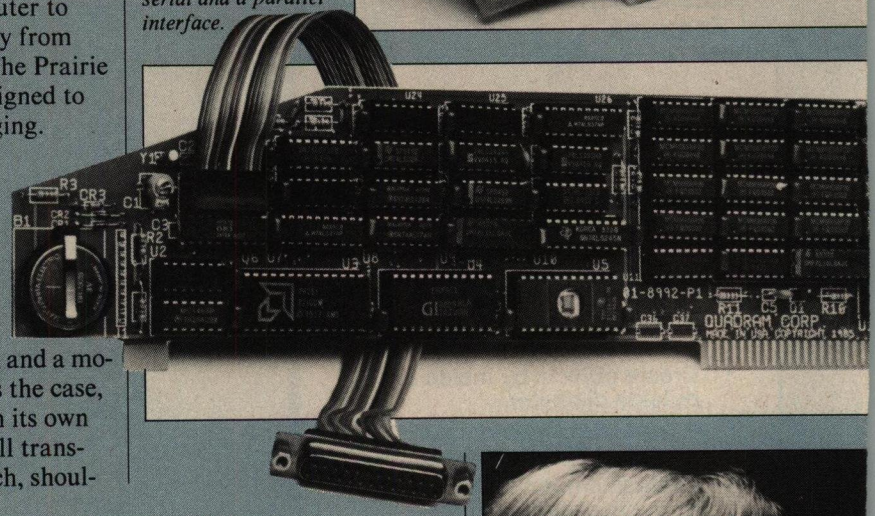
The Prairie Power system provides Apple IIc owners with a portable power system. The product's battery system features a rechargeable 12-volt battery that offers up to eight hours of continuous power and a circuit that sounds an alarm when the power reserve is low, automatically disconnecting the computer to protect the battery from deep discharge. The Prairie system is also designed to prevent overcharging.

The complete Prairie Power system is packaged in a water-resistant briefcase that can hold the computer, screen, and a modem and includes the case, battery pack with its own case, charger, wall transformer, disk pouch, shoul-

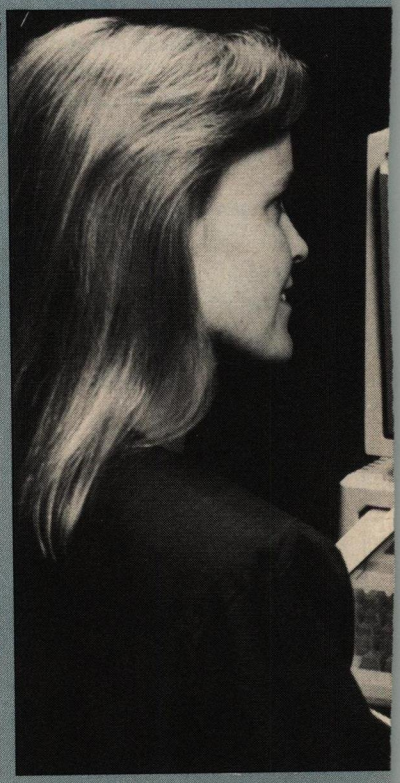


Quadram's ProDOS Clock/Calendar card for the Apple II enables users to set transmission rate, data format, parity, and other parameters by using the menu-driven configuration program.

Quadram's Multicore memory-expansion board provides both a serial and a parallel interface.



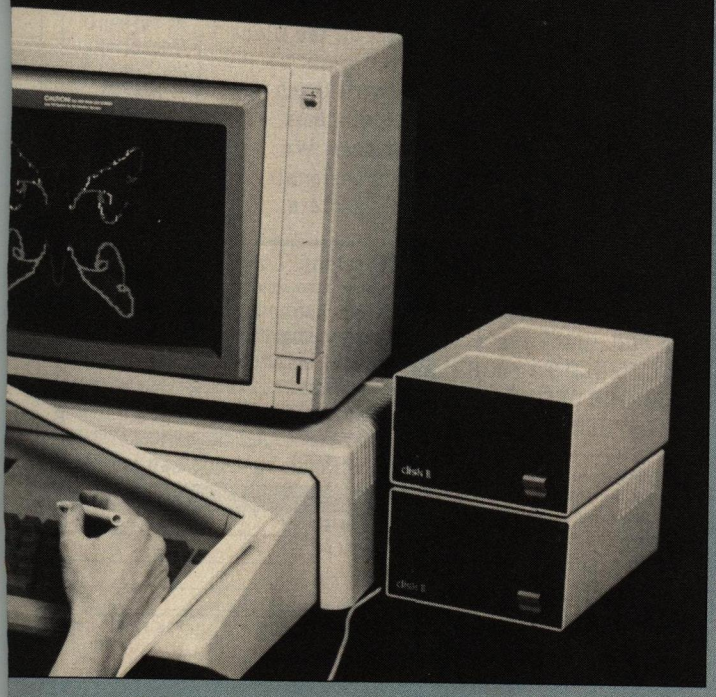
The Prairie Power system provides up to eight hours of continuous power for the Apple IIc.



der strap, and all necessary cables. *(List Price: $269.95)*
Requires: Apple IIc
Prairie Power Systems, Inc.
768 Twelve Oaks Center
15500 Wayzata Blvd.
Wayzata, MN 55391
(612) 475-1793
CIRCLE READER SERVICE NO. **541**

MacCharlie, from Dayna Communications

Touch Window, a touch-sensitive input device, can also work as a graphics tablet (see next page).



II SERIES

▶ VISION 2000 DRAFTING SYSTEM

The VISION 2000 Designer System, a 2-D drafting system for Apple computers, consists of a graphics touch tablet and a full-featured CAD (computer-aided design) software package that has automatic dimensioning capabilities. The touch tablet enables users to select commands from the menu screen and position the drawing cursor, and a pop-up numeric keypad eases numeric input. The system's features include multiple metric and English database units in fractions or decimals; 256 registered overlays; floating-point database structure; Cartesian, radial, relative, and local coordinate systems; and an easy-to-learn English command set.

Also available is a small, three-color robotic pen plotter that has a 1-meter umbilical cable, enabling it to work with a variety of paper sizes up to 24 × 36 inches. *(List Price: Designer System, $495; robotic pen plotter, $395)*
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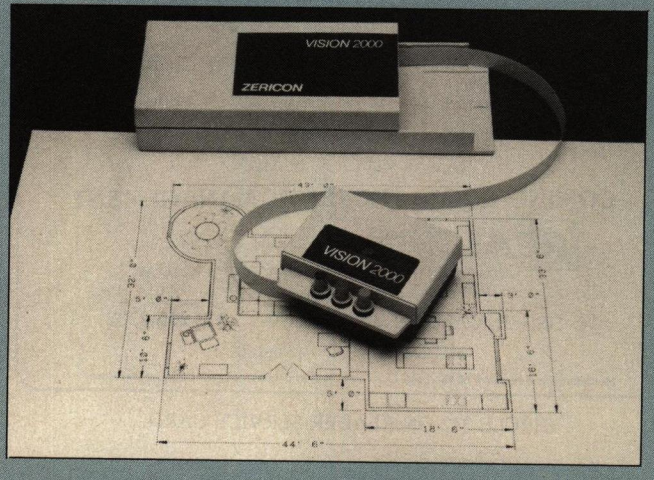
Zericon Corporation
1100 South Main Street
Racine, WI 53403
(414) 633-7381
CIRCLE READER SERVICE NO. **542**

The optional robotic pen plotter for use with Zericon's VISION 2000 2-D drafting system.



II SERIES

▶ QUADRAM ENHANCEMENT BOARDS

Quadram Corporation has introduced five new enhancement boards for Apple II computers.

Multicore is a multifunction, memory-expansion board that provides both a parallel and a serial interface. The board has a ProDOS-compatible clock/calendar for time- and date-stamping files, and its switchless setup lets users set transmission rate, data format, parity, and other parameters by using a menu-driven configuration program.

Designed for the Apple IIe, the Extended Multifunction Card extends the computer's on-screen display to 80 columns. This card is also equipped with a ProDOS clock/calendar and comes in a 64K configuration. A model that provides an RGB interface is also available.

The Serial Interface Adapter operates either Apple's Super Serial Card or Quadram's serial APIC C/G card. It provides

graphics support for Imagewriter and Scribe printers, permitting double-high-resolution and color printing. Users can select settings by using the supplied menu-driven software, and all settings are stored in nonvolatile memory.

As does Multicore and the Serial Interface Adapter, the new Buffered Serial Printer Adapter features switchless settings and a supplied configuration program. The board is designed to provide ROM-based graphics support for double-hi-res and color printing with Imagewriter and Scribe printers and has a 64K print spooler that is expandable to 256K.

The fifth product, the ProDOS Clock/Calendar, lets users time- and date-stamp files and comes with a long-life lithium battery and time- and date-setting software. *(List Price: Multicore, $219 for 0K, $279 for 64K, $329 for 128K, $399 for 256K; Extended Multifunction Card, $299—$275 for RGB; Serial Interface Adapter, $99; Buffered Serial Printer Adapter, $139 for 64K, $199 for 128K, $259 for 256K; ProDOS Clock/Calendar, $79)*

Requires: Apple II, II Plus, or IIe

Quadram Corporation
4355 International Blvd.
Norcross, GA 30093
(404) 923-6666

CIRCLE READER SERVICE NO. **543**

HARDWARE

A-MAX FOR THE II

The Mockingboard Division of Sweet Micro Systems has introduced the A-Max (short for Audio Maximizer), a self-contained pair of three-inch speakers with an earphone jack and individual amplifiers for each speaker. Owners of Mockingboards A or C can plug them into the two RCA plugs on the back of A-Max and take advantage of its remote volume controls and earphone jack. A-Max connects to the Apple's internal plug and a ground screw and is easy to install. *(List Price: $49.95)*

Requires: Apple II, II Plus, or IIe

Sweet Micro Systems
50 Freeway Drive
Cranston, RI 02920
(800) 341-8001
(401) 461-0530

CIRCLE READER SERVICE NO. **544**

TOUCH WINDOW

Personal Touch has released Touch Window, a touch-screen input device that mounts directly on the screen of a monitor or TV that has a 10–15-inch diagonal. The device has a transparent, pressure-sensitive surface area of 8½ × 11 inches that users can touch with a finger or stylus to interact directly

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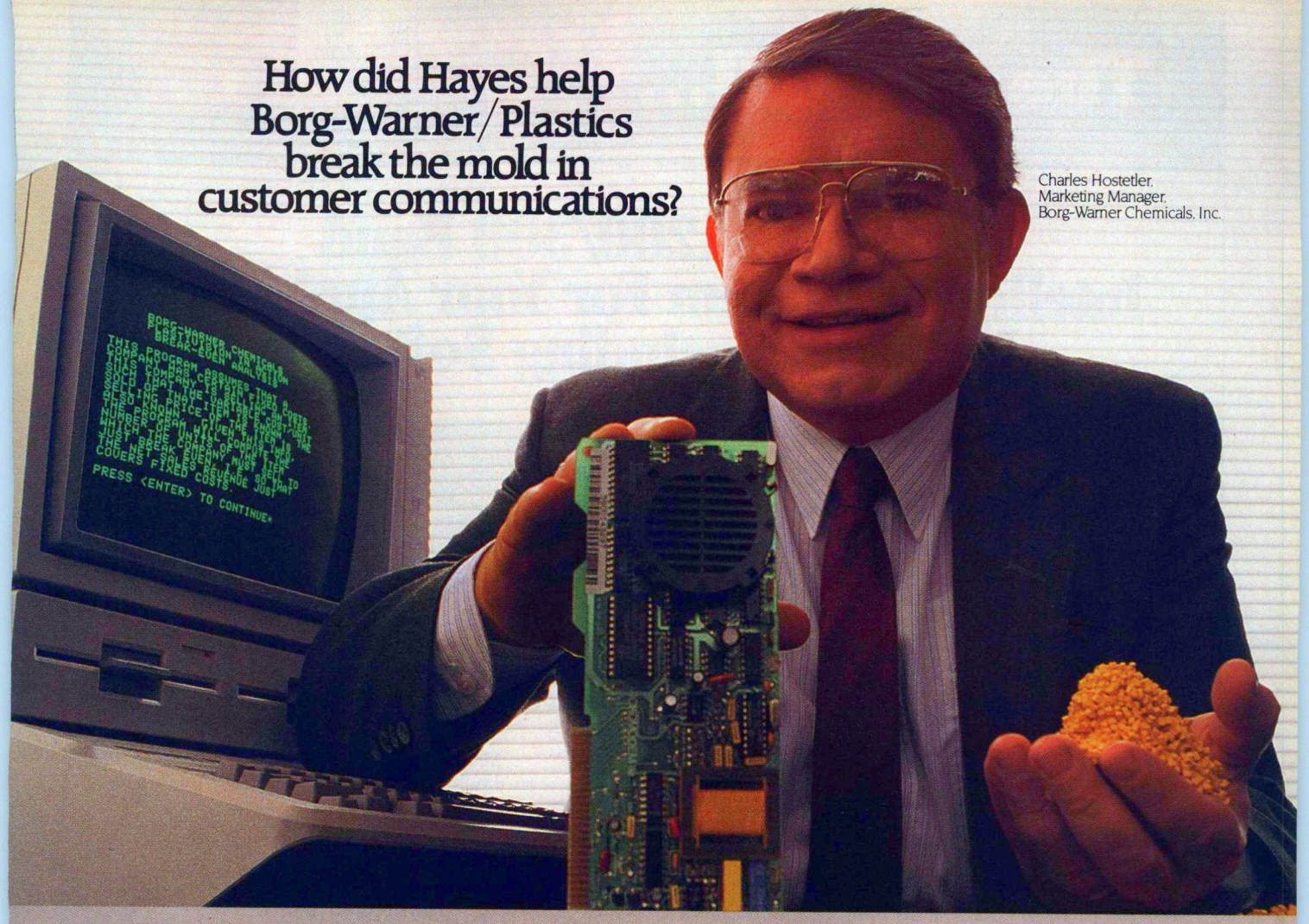
How did Hayes help Borg-Warner/Plastics break the mold in customer communications?



Charles Hostetler,
Marketing Manager,
Borg-Warner Chemicals, Inc.

Borg-Warner chose Hayes Micromodem IIe® and Smartcom I™ software. For quick, computer to computer communications with key customers.

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Now customers with Apple® IIe computer systems can communicate with the personal computers at Borg-Warner's headquarters through Plastivision,℠ a special on-line data base.

And Hayes Micromodem IIe plug-in board modems and Smartcom I software provide the critical communications link.

With their Hayes modems, customers can get immediate, accurate quotes based on detailed specifications. They can access entire catalogs of up-to-date technical information and industry news. And they have 24-hour-a-day troubleshooting assistance via computer.

Borg-Warner initiated Plastivision as a unique customer service. But now Hayes modems and software have helped streamline communications throughout the entire company.

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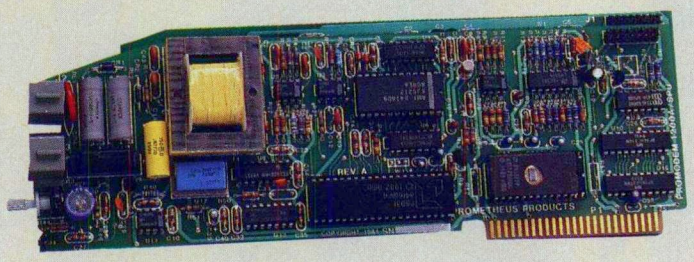
The Apple II... HOT-LINE

A Plug-In 1200/300 Baud Intelligent Modem For Your Apple II... Just $449 Including Software



ProModem 1200A is a 1200/300 baud Hayes compatible auto-dial modem card that plugs directly into any expansion slot in the Apple II, II+, or IIe. All you have to do is plug it in and connect the telephone cord.

Ours is the only 1200 baud modem to seriously consider for your Apple II. At just $449, it's priced well below its nearest competitor, yet it does much more. No longer do you have to buy an external modem, a serial card, an RS232C cable and communications software which, combined, would cost you hundreds of dollars more. There's really no comparison.

ProModem 1200A is the best modem, too. The internal software in its on-board ROM consists of a powerful menu driven terminal program. There is no need for a separate software disk. After a few keystrokes you'll be on-line and communicating.

Features include: Auto-dial/Auto-answer, tone and pulse dial, help commands, built-in diagnostics, two phone jacks, line status detect with redial on busy, full and half duplex and speaker with volume control.

You just can't lose when our plug-in ProModem 1200A comes ready to use, with on-board software, easy to understand documentation and a telephone cord — all for just $449.

A Powerful Menu-Driven Terminal Program

```
        1200A TERMINAL DRIVER
    © PROMETHEUS PRODUCTS INC.
```

```
1} COMMUNICATIONS
2} FILE TRANSFER
3} OPTIONS
            USE ESC TO EXIT
            ENTER SELECTION
```

```
1} BAUD RATE  1200  300
2} DATA BITS  8  7
3} PARITY NONE ODD EVEN MARK SPACE
            USE ESC TO EXIT
            ENTER SELECTION
```

```
1} TYPE        XMODEM  LINE
2} DIRECTION   SEND  RECEIVE
3} FILE NAME
            USE ESC TO EXIT
            ENTER SELECTION
```

```
1} PRINTER       ON  OFF
2} CLOCK         ON  OFF
3} STATUS LINE   ON  OFF
4} KEYBOARD      ON  OFF
5} CAP LOCK      ON  OFF
6} ECHO          ON  OFF
7} LF AFTER CR   ON  OFF
            USE ESC TO EXIT
            ENTER SELECTION
```

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CIRCLE 122 ON READER SERVICE CARD

with their computers. Users can also remove Touch Window from the display and use it as a graphics tablet, as an input pad, or as an Interactive Book pad for use with Personal Touch's Touch Action books. The product comes with an Interactive Book, a WindowWare disk, mounting tabs, and a manual. *(List Price: $199.95; plug adapter for II or II Plus, $7.50*
Requires: Apple II, II Plus, IIe, or IIc; plug adapter for II or II Plus
Personal Touch Corporation
4320 Stevens Creek Blvd.
Suite 290
San Jose, CA 95129
(408) 246-8822
CIRCLE READER SERVICE NO. **545**

II SERIES

▶ MULTIRAM IIe EXPANSION CARD

The MultiRam IIe is expandable from 64K to 768K, using 64K and/or 256K RAM chips. A 768K extension card attaches to the MultiRam and offers RGB video, as well as expanding the MultiRam IIe to a full 1.5 megabytes of RAM. MultiRam C for the Apple IIc is available in 256K and 512K versions.

Each MultiRam card also includes an AppleWorks desktop space-expansion program at no extra cost.

Exclusive to MultiRam IIe is a built-in 16-bit microprocessor port that permits direct linear memory addressing—up to the full 1.5 megabytes—by processors from the 8086, 68000, and 65816 processor families. With the 16-bit coprocessor card for the 65816 soon to be available from Com Log Company in Scottsdale, Arizona, the Apple IIe will approach the memory and processing capacity of a supermicro or minicomputer. *(List Price: MultiRam IIe, from 64K at $139.95 to 768K at $549.95; MultiRam C, 256K—$329.95, and 512K—$495.95)*
Requires: Apple IIe or IIc
Checkmate Technology, Inc.
509 South Rockford Drive
Tempe, Arizona 85281-3021
(602) 966-5802
CIRCLE READER SERVICE NO. **546**

II SERIES MAC

▶ MOUSETRACER DRAWING AID

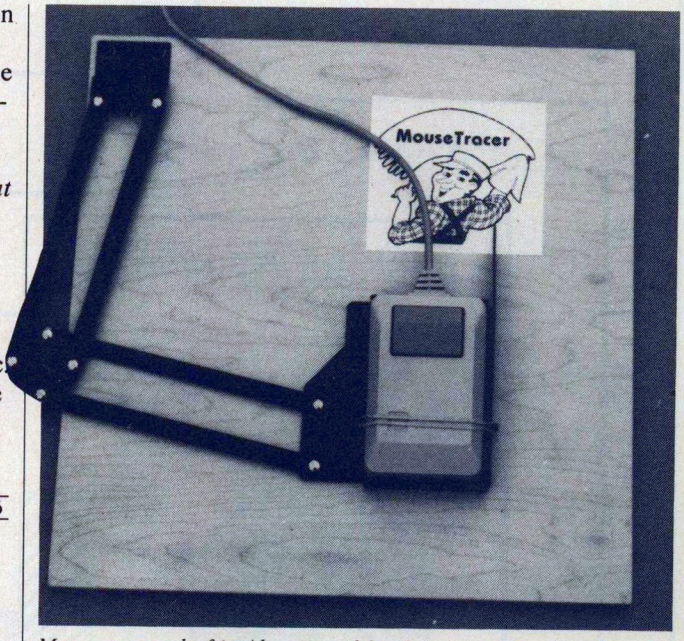
Mousetracer is a drafting/drawing aid that includes a specially designed mouse holder. Users can trace hard-copy graphics and artwork onto the computer screen when using a mouse-controlled graphics program.

Mousetracer is fully assembled and includes an instruction manual with 20 copyright-free drawings. *(List Price: $34.95)*
Requires: Apple IIe, IIc, or Macintosh
Brimark Innovations
9821 Yolanda Avenue
Northridge, CA 91324
(818) 885-8660
CIRCLE READER SERVICE NO. **547**

II SERIES

▶ STREET ELECTRONICS PERIPHERALS

Three new products for Apple computers are now available from Street Electronics. Designed for the Apple IIe are the BusinessCard, which includes two serial interfaces and a clock/calendar with battery backup, and the AlphaBits II, which has one serial printer/modem interface.



Mousetracer, a drafting/drawing aid for the Macintosh and the II series.

Both cards also feature more than 60 high-resolution graphics and text-printing commands that users can select from Macintosh-like pull-down menus. The cards can operate serial-interface printers or 300- or 1200-bps modems. A version of the BusinessCard for parallel-interface printers is also available.

The third product, designed for the Apple IIc, is the LiveWire, an intelligent converter cable that connects a parallel-interface printer to the IIc's serial port. The LiveWire also features a full-function clock/calendar with battery backup. The clock is built into the connector and allows users to time- and date-stamp ProDOS files. The LiveWire is available in both serial and parallel versions. *(List Price: BusinessCard, $200; AlphaBits II, LiveWire, $99.95)*
Requires: Apple IIe or IIc
Street Electronics
1140 Mark Avenue
Carpinteria, CA 93013
(803) 684-4593
CIRCLE READER SERVICE NO. **548**

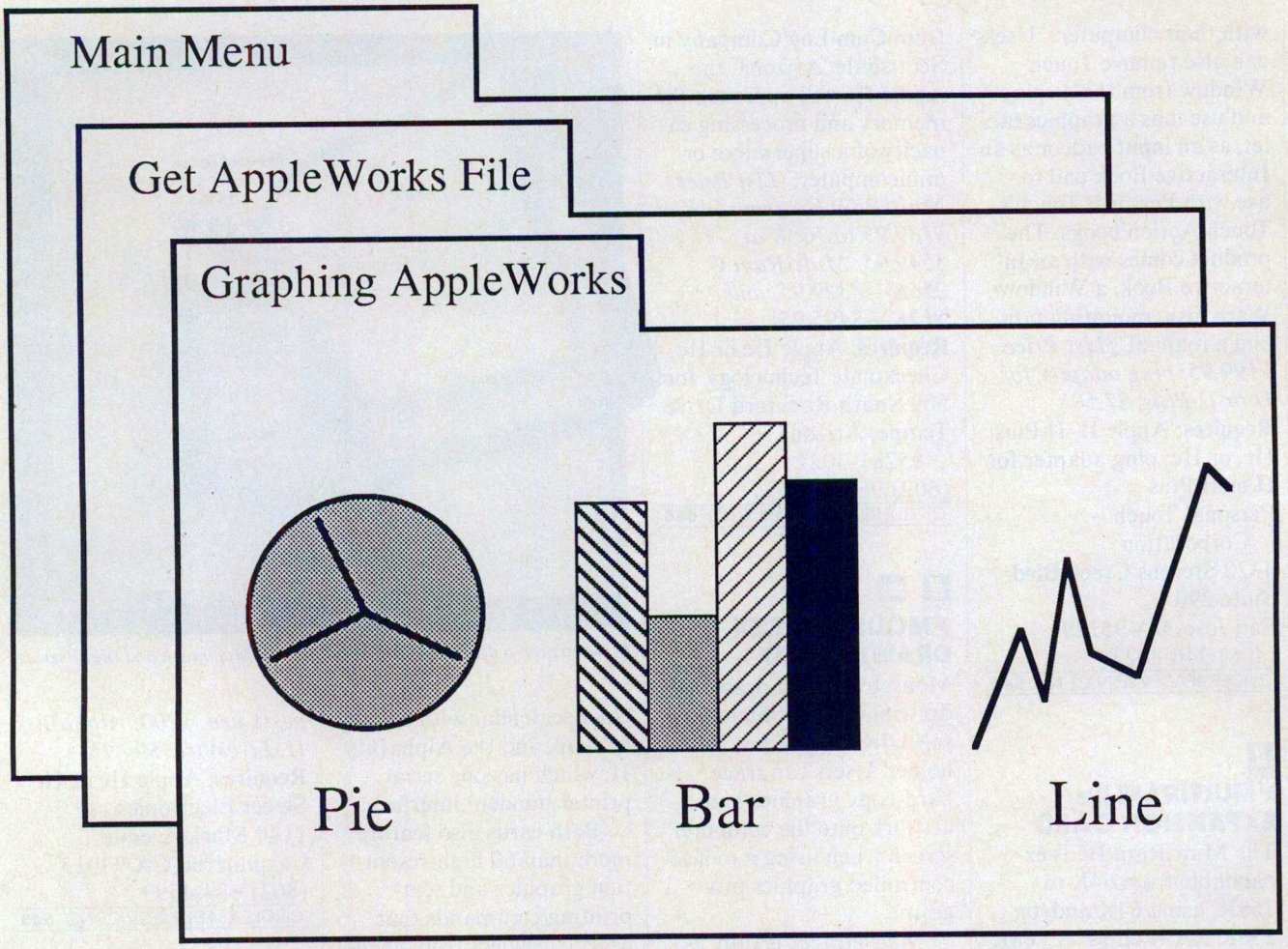
II SERIES

▶ COMPUTABILITY PRODUCTS

ComputAbility, a company specializing in hardware and software for people with special needs, has introduced two new products for the physically disabled. The Adaptive Firmware Card enables users to add one of 15 scanning techniques to commercially available software. The card also features one- or two-switch use; an assisted keyboard mode that adds locking Shift, Control, and Repeat functions; and the ability to alter the speed of interactive programs.

Designed for use with the card, the Unicorn Ex-

GraphWorks™



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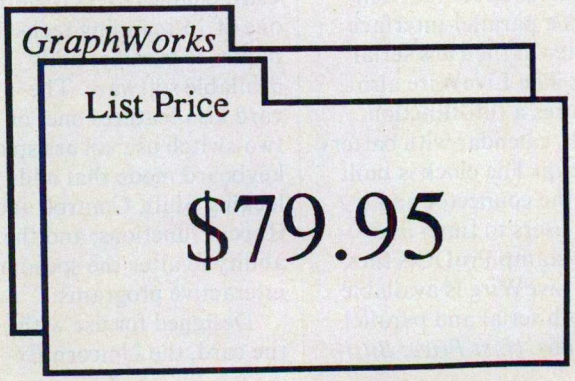

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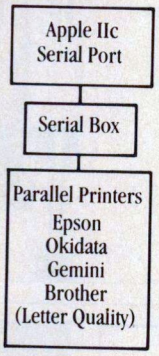


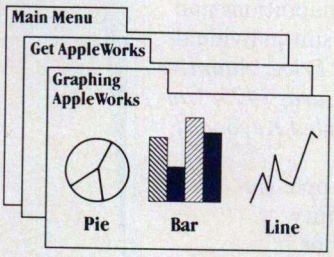
Add a parallel printer to your IIc

Here's a low cost serial to parallel adapter that comes complete with everything you need to connect your Apple's serial printer port to a standard parallel printer. This unit also allows you to print Epson Graphics. Please specify printer type.

A Serial Box for the Macintosh™ will soon be available. Call for details.

Serial Box for the IIc ~~$89.95~~ $69.95

★*Serial Box*



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Feathers & Space is an arcade-like game that takes full advantage of the graphics and sounds of the Macintosh. Attacking birds stress the defense capabilities of your mother ship and the space outpost. Protect the space outpost or get eaten alive. Mouse ship movements, click activated firing power and keyboard smart bombs. This game also offers defense from discovery; one click and your boss can't walk in and smart bomb you if you're defending your outpost at work.

Feathers & Space for Macintosh $34.95

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panded Keyboard is a lightweight flat panel that has 128 large touch-sensitive keys, any of which can be grouped to appear and function as a single, larger key.

The company also offers a service, The Handicapped's Source, that develops and sells specialized hardware adaptations and software to suit individual needs. *(List Price: Adaptive Firmware Card, $425; Unicorn Expanded Keyboard, $375)*

Requires: Apple IIe

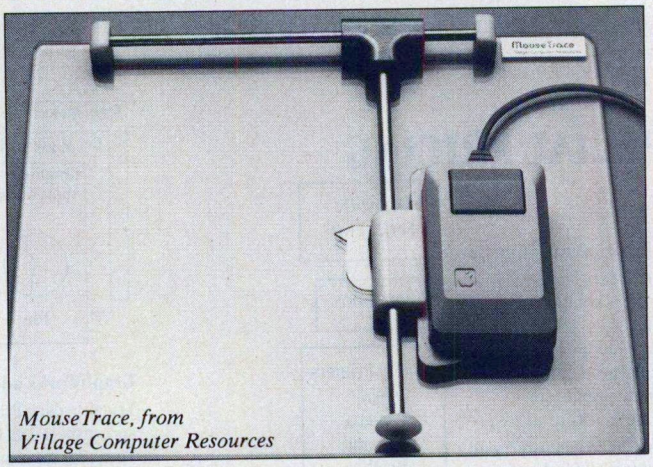
ComputAbility Corporation
101 Route 46 East
Pine Brook, NJ 07058
(201) 882-0171

CIRCLE READER SERVICE NO. **549**

II SERIES MAC

▶ MOUSETRACE

You can use the pictures you create with MouseTrace (working from drawings, pictures in books or magazines, maps, diagrams, or charts) in a graphics program such as MacPaint or MousePaint. The MouseTrace board is made of abrasion-resistant acrylic, and the clear board gives you a flat working surface even if you are tracing from a book. Stainless-steel rods give durability, and linear ball bushings give smooth operation. *(List Price: $89)*



MouseTrace, from Village Computer Resources

Requires: Apple IIe, IIc, or Macintosh

Village Computer Resources
P.O. Box 155
Lakewood, CA 90714
(213) 421-3412
(800) 321-3500 (orders only)

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▶ HARDWARE /SOFTWARE

II SERIES

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kyan

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kyan pascal is the most complete package available for learning and using the Pascal language. And now, it's available for the Apple II family of computers.

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forward, turn right or left, stop, sound its buzzer, and turn on its light. Using the programming feature, the operator can determine a course or set up a maze for the robot to negotiate. The brain of the Memoncon Crawler is an on-board static RAM (256 × 4 sequencer). It comes with a prewired and tested electronic circuit board and a 5-key teaching pendant with connecting cable.

Available, too, is a Programming Kit, which enables you to program the Memoncon through your computer instead of through the teaching pendant. You can write your own program, edit it, store it, and then load it into the Memoncon RAM. The Programming Kit includes an interface cable for use between the Memoncon Crawler and your computer, a software diskette, and instructions. *(List Price: Robot Kit, $74.95; Programming Kit, $39.95)*
Requires: Apple II Plus or IIe
Buyus, Inc.
10 White Birch Drive
Ossining, NY 10562
(914) 762-4799
CIRCLE READER SERVICE NO. **552**

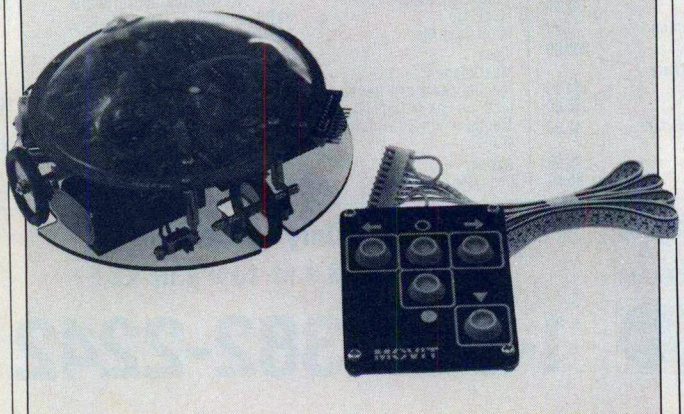
▶ SOFTWARE

MAC

▶ 1STPORT DATA CONVERSION

A communication and data-conversion package, 1STPORT allows the Macintosh to function as an ASCII terminal for communicating with other micros, mainframes, and public databases. Users can send or receive both ASCII and binary data and thus can transfer programs and data files. 1STPORT can also convert data transferred to the Macintosh into several different data formats for use with a variety of Macintosh software, including DeskTop Software's 1STBASE relational-database program. The software has five options—1STBASE file, DIF file, SYLK file, fixed record-length text file, and the Clipboard. *(List Price: $95)*
Requires: Macintosh, 128K or 512K RAM
DeskTop Software Corporation
CN-5287
Princeton, NJ 08540
(609) 924-7111
CIRCLE READER SERVICE NO. **553**

Memoncon Crawler Robot, from Buyus, Inc.



MAC

▶ OMNITALK NETWORK SOFTWARE

To provide Macintosh users of Apple Computer's AppleTalk network with true shared access to its OmniDrive disk drives, Corvus Systems has introduced OmniTalk network software. OmniTalk is designed to work with the Apple Finder program and allows users to share application programs, as well as read and write safely to different controlled volumes on OmniDrive. The software also lets users divide the drives into private, public, and controlled volumes of varying sizes with three levels of password protection. *(List Price: $395)*
Requires: Macintosh, AppleTalk, OmniDrive disk drive
Corvus Systems, Inc.
2100 Corvus Drive
San Jose, CA 95124
(408) 559-7000
CIRCLE READER SERVICE NO. **554**

II SERIES

▶ KYAN PASCAL

Designed for both beginning and advanced programmers, Kyan Pascal is a full implementation of Jensen/Wirth Pascal. For beginners the package has command menus, help screens, a comprehensive tutorial manual, and an extensive library of compiler error messages. In addition the Kyan Pascal software provides advanced programmers with a powerful ProDOS-based software-development system featuring a 6502 machine-code compiler, a full-screen text editor, full-pass error detection, enhanced sound and graphics, a built-in assembler, random-access files, and powerful extensions to standard Pascal. *(List Price: $69.95)*
Requires: Apple II Plus, IIe, or IIc; 64K RAM; one disk drive
Kyan Software
1850 Union Street
Suite 183
San Francisco, CA 94123
(415) 775-2923
CIRCLE READER SERVICE NO. **555**

MAC

▶ MACCRACK PAK II

Bay Systems is now distributing FWB's MacCrack Pak II, a software-utility package for the Macintosh that allows users to back up copy-protected software so that they need not risk using the software's master disk. The product also enables users to upload many software packages from floppy to hard disks and RAMdisks. The package is geared to novice users and comes with step-by-step instructions. *(List Price: $79.95)*
Requires: Macintosh or Macintosh XL
Bay Systems Company
1001½ Broadway
San Francisco, CA 94133
(415) 474-8055
CIRCLE READER SERVICE NO. **556**

II SERIES

▶ EDUCATIONAL WORD JUGGLER

An educational edition of the word-processing program Word Juggler, designed for grades 5 through 12, is now available. The educational edition has all the features of the business-level program, including replacement keycaps that label the principal editing

CRYSTALWARE

"TAKE YOUR MAC TO THE LIMIT...AND BEYOND!"

Crystal has been a leading producer and certified developer of Apple software since 1979. They produced the first graphic adventure for the Apple...House of Usher and the grandfather of all adventure games, the six-disk Fantasyland 2049 A.D. In 1981 John and Patty Bell and Mike Potter produced Protector which was a major hit in the arcade software market. Crystal currently has more than 65 titles available which run on a dozen micros.

The Mac has incredible graphics and memory. Some of our games take up as much as 1 million bytes, include dazzling graphics and sound, and will give your Macintosh a run for it's money. We also produce a fine line of business packages and graphics utilities.

WIZARD OF ZEN

A children's anthology with Tic-Tac-Toe, Hangman and Grumpus. It's a series of Fantasy Tales for bedtime reading and an educational graphic adventure called the Wizard of Zen where you go inside a computer to the Land of Zen. Also includes Mr. Key to help young users learn about the keyboard and how to use it.
Now Available! $29.95/disk

GHOST MANSION

Enter the creepy old Ludwig estate with its hundreds of rooms, forests, garden path, a vast cemetery and crypt, and a host of vampires, werewolves and secret passages. Even compiled, this game takes up more than 320,000 bytes on disk. A challenge for even the most seasoned adventurer with a "save game" feature so that you may play this game in more than one sitting. In the development of this game, it took our Macintosh more than an hour to display all the castle and grounds, with each display generated in only a few seconds. We are offering a prize of $100 for the first person to solve the mystery and send in their solution by certified mail! Now Available, also available for the Apple IIe & IIc!
$49.95/disk

POOR JOHN'S ALMANAC

This is the first of our series of practical business application programs, inspired by requests of our Midwest users. It includes a wealth of information on agriculture, animal husbandry, and farming. It also has an inventory control package and more information on AGRINET, our online information service on current meat and grain prices. We have received enormous support already for this package but still could use a lot more information. If you are currently involved in this industry and would care to share your know- ledge, we would be pleased to hear from you in writing or by phone.
Now Available! $49.95/disk

ZARDON- JOURNEY TO THE CRYSTAL PLANET

Somewhere in another galaxy far, far away is the legendary Crystal Planet. It is a voyage of many centuries through the uncharted regions beyond the Galactic Frontier. Besides a clever captain you must also be a shrewd trader for it is impossible to take enough supplies for your quest so you must acquire goods and additional gold and silver along the way. This game is the forerunner of the later to be released Galactic Expedition. It contains incredible high speed graphics, a great deal of animation, and is unlike anything currently on the software market. Now Available! $49.95/disk

CRYELL - THE PATHFINDER

Imagine a fantastic voyage through the human body in a minature submarine the size of a pin-head. Imagine being able to travel through the human circulatory system and battling amoebic antibidies with your onboard laser while piloting your ship through a fascinating 3-D animated color simulation. Picture if you will, another dimension of adventure in sight and sound and color. You have just begun to experience Cryell-the-
Pathfinder. Now Available!$39.95/disk

GOPHER

Deep in the earth, lurking in a labyrinth of tunnels beneath Uncle John's garden, lives Henry the Gopher. As you tunnel through earth you must avoid falling rocks and set traps for the Veggie Bandit.
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CIRCLE 213 ON READER SERVICE CARD

and formatting functions, and the Lexicheck spelling checker. In addition, the product includes a teacher's guide, a student handbook that contains 12 tutorial-style lessons, and a student activity disk. Purchases must include at least one teacher's edition and three student editions. *(List Price: teacher's edition, $189; student's edition, $100)*
Requires: Apple IIe or IIc
Quark, Inc.
2525 West Evans
Suite 220
Denver, CO 80219
(800) 543-7711
(303) 934-2211
CIRCLE READER SERVICE NO. **557**

MAC

▸ QUARTET GRAPHICS /SPREADSHEET

Haba Systems has released an integrated spreadsheet and graphics program, Quartet, for the Mac. The program can display spreadsheets, charts and graphs, and text windows simultaneously and also has database capabilities. The program can handle spreadsheets of up to 62 columns by 999 rows and includes all commonly used spreadsheet functions, as well as functions such as Date, Net Present Value, Internal Rate of Return, Future Value, Payment, Standard Deviation, and Variance. In addition, Quartet can create data tables that allow users to view results of complex "what if" scenarios. *(List Price: $199)*
Requires: Macintosh
Haba Systems, Inc.
15154 Stagg Street
Van Nuys, CA 91405-1025
(818) 989-5822
CIRCLE READER SERVICE NO. **558**

MAC

▸ FINANCIAL COOKBOOK

Financial Cookbook, a program that helps users make personal financial decisions, is now available on disk for the Macintosh computer. The software contains 32 recipes, or formulas, that produce answers to questions about taxes, investments, savings, mortgages, the effects of inflation, and other financial issues. Calculations for 11 basic tax shelters are also included in the program. Financial Cookbook contains a tutorial, "recipe" instructions, and a 100-item index and comes with a manual that provides thorough explanations of financial and tax issues and a glossary of terms. *(List Price: $50)*
Requires: Macintosh
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171
CIRCLE READER SERVICE NO. **559**

MAC

▸ MACENGINEER-ELECTRICAL ENGINEERING

Superex has released MacEngineer-Electrical Engineering, the first in a series of four engineering programs for the Macintosh. The software contains 30 formulas for the most frequently used engineering calculations. Users select the formula they wish to use and enter the variables, and the program then calculates and displays the result.

Superex is encouraging users to send it any important formulas that they feel should be included in the program. If the company uses any of the suggested formulas in its next version of MacEngineer-Electrical Engineering, the customer will receive a $25 U.S. Government Savings Bond for each formula and a free updated version of the program. *(List Price: $99.95)*
Requires: Macintosh
Superex Business Software
151 Ludlow Street
Yonkers, NY 10705
(800) 862-8800
in NY (914) 964-5200
CIRCLE READER SERVICE NO. **560**

MAC

▸ MACINTOSH MICROPLANNER

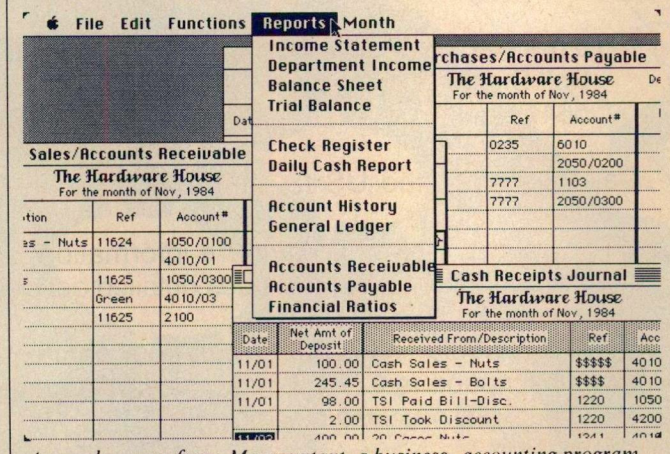
In conjunction with Apple Computer, Micro Planning Software has developed Macintosh MicroPlanner, an easy-to-use, professional project-management software project. A demonstration package, which is refundable against the later purchase of the product, is also available. *(List Price: $395; demo package, $25)*
Requires: Macintosh
Micro Planning Software USA
235 Montgomery Street
Suite 840
San Francisco, CA 94104
(415) 788-3324
CIRCLE READER SERVICE NO. **565**

MAC

▸ MACCOUNTANT FOR BUSINESSES

Designed for small-business use, Maccountant is an easy-to-use accounting program that offers the full range of accounting functions from General Ledger to Accounts Payable and Receivable. The program's management-planning aids include the ability to break financial statements out into 99 categories that allow users to analyze trends in sales, personnel, product lines, customers, and so on. Windowing and scrolling features enable users to work with many statements simultaneously.

The Maccountant program can handle a full year's data on one disk and can also produce detailed integrated reports with flexible reporting periods. A free demo disk is available. *(List Price: $195)*
Requires: Macintosh, 128K or 512K RAM
Digital, Etc.
1749 14th Street
Santa Monica, CA 90404
(800) 922-7500 or
(213) 452-5636;
in UT (800) 622-2500
CIRCLE READER SERVICE NO. **566**



A sample screen from Maccountant, a business- accounting program for the Macintosh

MAC

▸ MACBOOSTER MEMORY MANAGEMENT

MacBOOSTER, a cache memory-management system for 512K and larger Macintosh computers, can speed up the computer's operation by 2–10 times. The software stores frequently used disk-based data in a cache in memory, thereby reducing the number of times that a disk is accessed. The system is intelligent, using statistical analysis to select the best data to keep in the cache, and, once installed, is transparent to the user. It also guarantees data integrity and ensures that any modifications users make to disk-based data are made to data in the cache memory as well. *(List Price: $50)*

Requires: Macintosh

Mainstay
28611B Canwood Street
Agoura Hills, CA 91301
(818) 991-6540

CIRCLE READER SERVICE NO. **567**

MAC

▸ RGS SOFTMAKER II

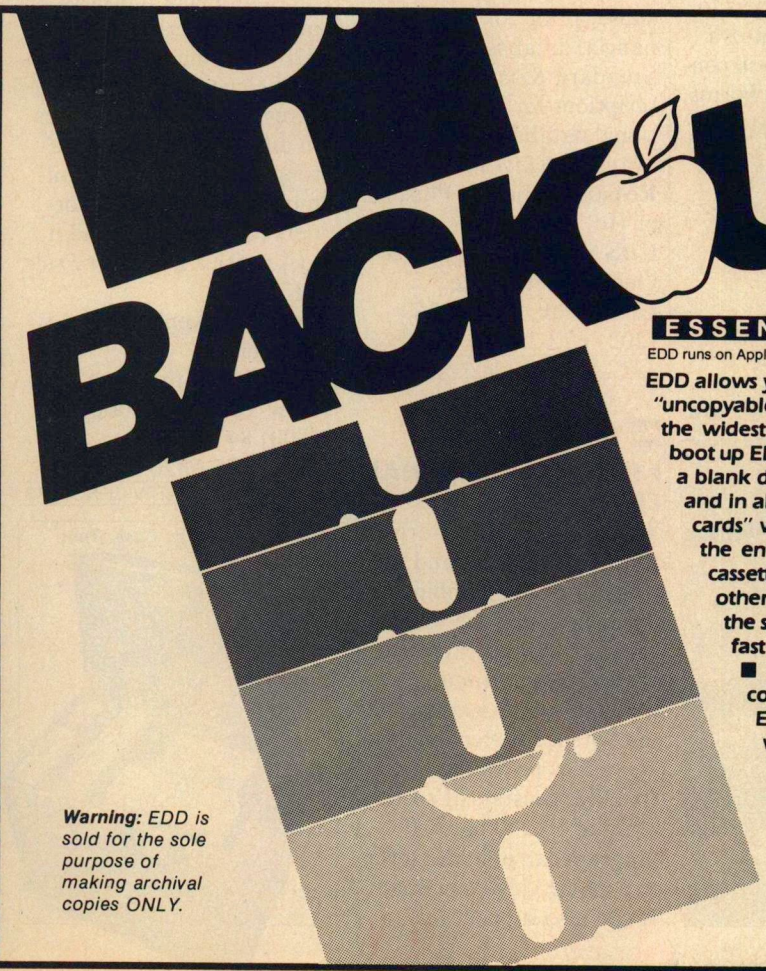
RGS Softmaker II (New Version) is a database-management system that provides a variety of utilities, including deletion, mass deletion, merging, sorting, and renaming of data files. The software also features on-line help, password protection, formula definition for customized reports, mathematical functions, and the ability to total all numerical columns with 14-digit accuracy. As an additional feature, the system can left-justify all alphabetical columns and right-justify numerical columns for easy-to-read reports. *(List Price: $199)*

RGS Softmaker II is a database-management system for the Macintosh.

Requires: Macintosh

Rio Grande Software, Inc.
221 Nolana
P.O. Box 5906
McAllen, TX 78504
(800) 527-1121
in TX (800) 292-1031

CIRCLE READER SERVICE NO. **568**



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3377 Solano Ave., Suite #352
Napa, CA 94558 (707) 257-2420

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MAC

▸ QUICKDISK FROM SYMMETRY

An easy-to-use RAMdisk program, QuickDisk enables the Macintosh to operate up to ten times faster than normal by making a portion of the computer's memory look and act as though it were a superfast, silent disk drive. Users can select the size of the RAMdisk, from 50K up to 350K. Other features of the program include automatic file copy and automatic ejection of the startup disk. *(List Price: $34)*

Requires: Macintosh

Symmetry Corporation
3900 East Camelback Road
Suite 103-S
Phoenix, AZ 85018
(602) 224-5944

CIRCLE READER SERVICE NO. **569**

MAC

▸ MAC COBOL LANGUAGE

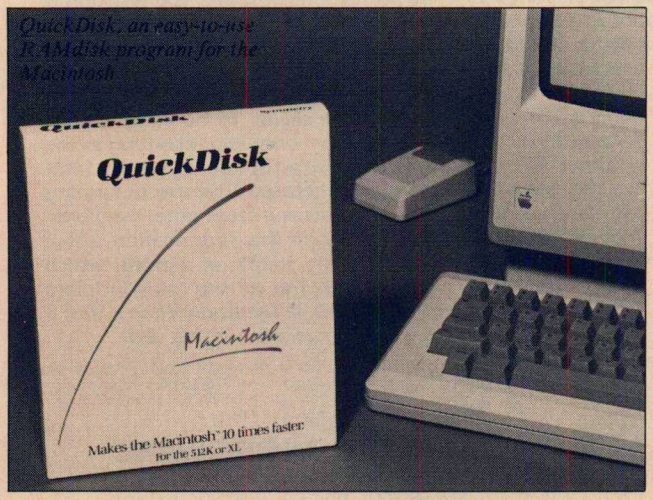
Designed for program developers, Mac COBOL is a COBOL language that provides access to 386 of the Macintosh's 512 ROM routines, enabling programmers to compile CALLs directly from ROM routines, as well as build Macintosh windows and menus into their applications. Mac COBOL features Micro Focus' High Performance Level II compiler and is fully compatible with existing Micro Focus applications. Other features include a COBOL source-code editor; an ANSI '74 COBOL compiler; a generate tool, which compiles Micro Focus intermediate code into 68000 object code; a run tool, which allows users to execute multiple independent programs; a build tool, which combines programs with Micro Focus Application Support Modules; and ISAM file handling.

The second edition of Mac COBOL, available at no extra charge to customers who buy the first version, will provide access to the remaining Macintosh ROM routines and will contain features such as Forms, Animator, and Library. *(List Price: $2000)*

Requires: Macintosh or Macintosh XL with MacWorks, 512K RAM, one disk drive

Micro Focus, Inc.
2465 E. Bayshore Road
Palo Alto, CA 94303
(415) 856-4161

CIRCLE READER SERVICE NO. **570**



QuickDisk, an easy-to-use RAMdisk program for the Macintosh

II SERIES

▸ STOCKPAK II SOFTWARE SERVICE

CBS Software has reached an agreement with Standard & Poor's Corporation to market Stockpak II, a stock-market software service developed for use on home-computer systems. Stockpak II integrates an easy-to-use data-management program with a financial database that provides analysis information about 1500 actively traded companies. The program enables users to analyze and compare trends and the performance of one or more companies using tables and graphs, and they can then save or print resulting reports. The software includes a six-month subscription for updated financial database disks from Standard & Poor's; subscriptions for three additional databases are also available. *(List Price: $150)*

Requires: Apple II Plus, IIe, or IIc

CBS Software
One Fawcett Place
Greenwich, CT 06836
(203) 622-2500

CIRCLE READER SERVICE NO. **571**

MAC

▸ INTOUCH TERMINAL EMULATOR

A mouse- and menu-driven terminal emulator and file-transfer utility combined, inTouch allows the Macintosh to communicate with virtually any computer system and use programs written for specific terminals. As well as providing error-free file transfers at speeds of up to 19,200 baud, the program can emulate several popular video terminals. It can also support the CompuServe Vidtex and Text, XMODEM, or Crosstalk protocols. Its Data Capture mode allows you to save a complete communication session to play back at your convenience. *(List Price: $149.95)*

Requires: Macintosh

Software Masters, Inc.
P.O. Box 570417
Houston, TX 77257-0417
(713) 266-5771

CIRCLE READER SERVICE NO. **572**

▸ ACCESSORIES

II SERIES

▸ IIC TRAVEL CASE

This sturdy case holds the Apple IIc, a IIc monitor on its stand, and an external disk drive. It also has an extra foam-padded compartment to hold a mouse or modem. Fiberbilt case #20439 is made of black polyethelene plastic and measures 21 × 13 × 16 inches in diameter. It features a tongue-and-groove aluminum frame and steel corners for durability, and it locks with a key. *(List Price: $175)*

Requires: Apple IIc

Fiberbilt
601 West 26th Street
New York, NY 10001
(800) 847-4176;
(212) 675-5820 in NY

CIRCLE READER SERVICE NO. **573**

Apple IIc Travel Case, from Fiberbilt

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Macintosh

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PFS:Proof	43.00
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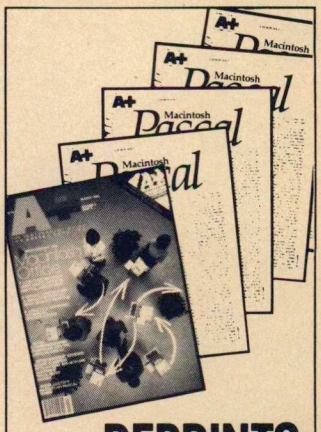

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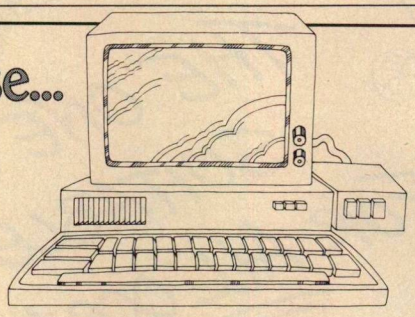

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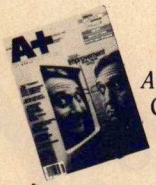

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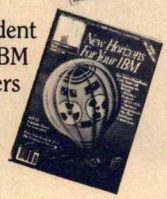

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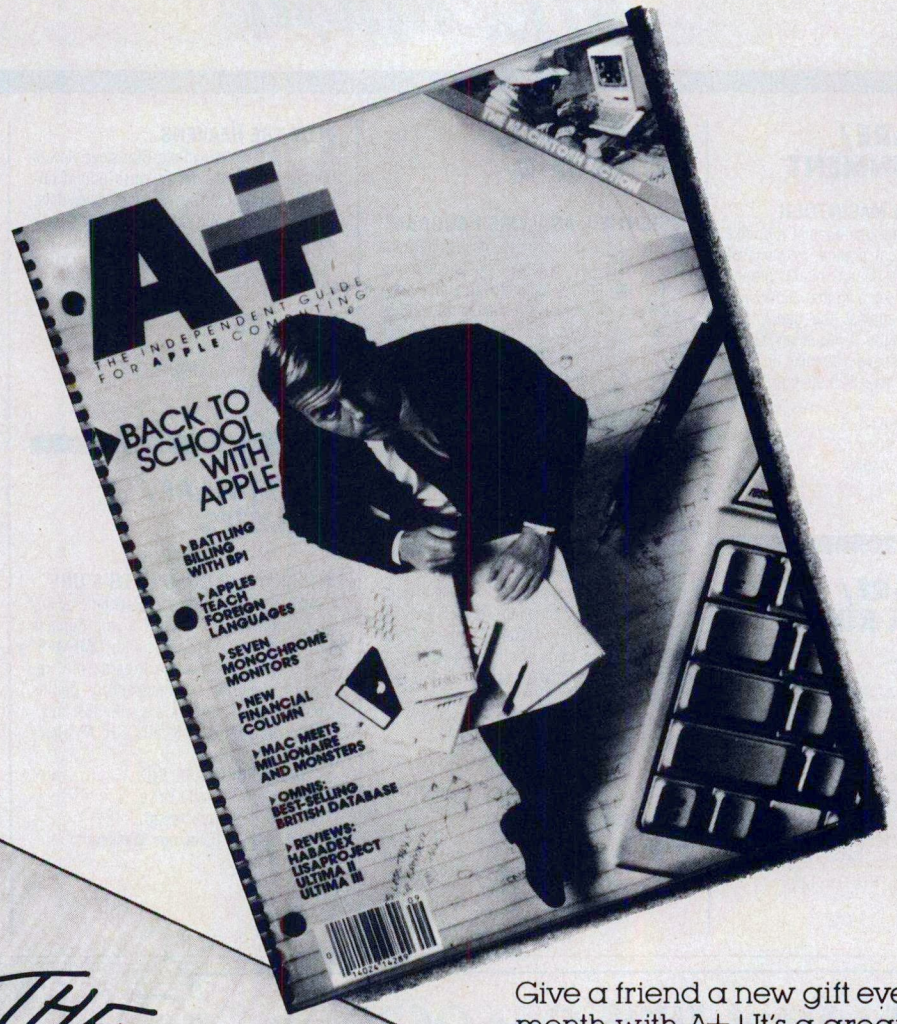

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Questions from our readers

DISK BACKUPS

Q. *I recently saw some ads for Essential Data Duplicator and Copy II Plus in your magazine. Having just accidentally destroyed my Deadline disk, I would like to know if these backup utilities work.*

A. Yes, they work with most software. You may need to know special parameters or methods to make a backup copy with them, though. The copy will still be copy-protected; thus, you will not be able to use COPYA to produce a copy of the copy.

I recommend sending your damaged disk back to Infocom for replacement—the company will send you a new one for $5. Most other publishers have similar policies.

Copy-protection is a sticky subject. Producing software is costly, and many publishers feel that they must protect their investment from unauthorized duplication and distribution.

Apple's official policy is not to copy-protect its software unless the author insists. Thus, Apple Writer is protected, but AppleWorks is not. Apple includes a backup disk in the Apple-Writer package, though. Other publishers may charge a small fee for a backup disk. Most game publishers replace damaged disks for $5. United States copyright law states that you are entitled to make a single backup copy of software that you own, but the case of software that is licensed to you is not as clear-cut.

An important point here is that developers will produce new software only if they can get a reasonable return on their investment. New software is the only thing that is going to keep *your* investment in your Apple worthwhile. So back up your software for your own use only.

DISK DRIVE VS. RAMDISK

Q. *I have an Apple IIe with one disk drive and realize that I need another. I have read many articles that describe the benefits of RAMdisks, however. I work in Pascal and with CP/M in addition to DOS. Should I purchase a RAMdisk or a regular disk drive?*

A. Although RAMdisks do have their advantages, a regular disk drive is probably your best choice for a second drive.

Two different types of RAMdisks are available for Apple IIe computers. The first kind plugs into the standard expansion slots and also works with Apple II and II Plus computers. These interface cards have a lot of memory (I have one with 292 K), and you can configure them to emulate one large disk or several smaller ones, depending on your needs and the operating system (DOS, Pascal, or CP/M).

The other type of RAMdisk plugs into the auxiliary slot and functions as an 80-column card, in addition to having RAMdisk capabilities. In fact, under ProDOS, the standard Apple Extended 80-Column Card can function as a RAMdisk with about two thirds of the capacity of a standard floppy disk. Extended 80-column cards from other manufacturers offer greater capacity.

The RAMdisk capabilities are a function of the software you are running. Most manufacturers offer DOS 3.3, ProDOS, CP/M, and Apple Pascal RAMdisk software. Your current programs may or may not work with this new software. Generally, DOS 3.3 software that allows entry of a slot number when you're loading or saving files does work with RAMdisks. Pascal users must specify the correct volume name for the RAMdisk, and CP/M users have to indicate addresses by disk name (C:, D:, and so on). Software that modifies the operating system to coax better performance from the Apple Disk II probably will not work with a RAMdisk. Software that you have to boot to run, such as most copy-protected pro-

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CIRCLE 306 ON READER SERVICE CARD

grams, probably will not work with a RAMdisk.

Furthermore, if you forget to transfer your programs or data from the RAMdisk back to a floppy disk before turning off the computer, or if you suffer a sudden power loss, you'll lose all your data. These problems don't exist for a second physical disk drive.

On the other hand, programmers—especially Pascal programmers—can greatly benefit from RAMdisks.

Compiling and linking from a RAMdisk is a dream. Were you considering a third disk drive, I wouldn't hesitate to recommend a RAMdisk.

KEYBOARD UPGRADES

Q. *As a long-time Apple II Plus user, I have tried just about everything to get around the shortcomings of the keyboard. Replacement keyboards are expensive, although recently I have noticed ASCII-encoded keyboards for less than $100. What can I do?*

A. I have a Videx Keyboard Enhancer on my Apple II Plus and have had no problem adapting to its peculiarities (e.g., to enter the Uppercase/Lowercase mode with the Videx Enhancer installed, you must press Reset). Installation is simple if you have the keyboard-encoder board hanging from the bottom of the keyboard (i.e., if you have a Rev. 7 or later motherboard). The latest version of the Videx product (Enhancer II) also has an optional strip of function keys but does not offer a numeric keypad.

To get your Apple to display uppercase and lowercase letters without an 80-column card, you must purchase a new character-generator ROM (I recommend the Paymar ROM). Installation is as simple as it is with the Videx Enhancer and requires only a chip puller. Unless you enjoy taking your Apple computer apart, install both the Enhancer and the new ROM at the same time.

If you have an 80-column card and do not use the normal Apple 40-column text screen much, you do not need the new character-generator ROM. Your 80-column card can already generate uppercase and lowercase letters.

If you want a numeric keypad, consider purchasing a high-quality (read expensive) add-on keyboard. The inexpensive keyboards are not very good; their keys stick and they give you duplicate characters on the screen (keyboard bounce). One of the most popular of the add-on keyboards is produced by Keytronics (P.O. 14687, Spokane, WA 99214 [509]-928-8000). With an external keyboard and no 80-column card, you will still need a new character-generator ROM.

After all of this, you may be better off purchasing an Apple IIe and an Apple numeric keypad. I don't know what additional periperhals you have on your system, but most of them should work with the IIe. You'll gain the better keyboard, the uppercase/lowercase ROM, and the ability to run all the latest software, such as AppleWorks.

PRINTER-CONTROL CODES

Q. *My Panasonic KX-P1090 printer does not respond to printer commands as I expect them to in Apple Writer. For example, the printer manual states that, from BASIC, I should type* PRINT cha4(27);"W", CHA$(1). *When I assign an Apple Writer glossary item to* ESC W 1, *the printer does not go into the double-width mode. What am I doing wrong?*

A. Printer-control codes are everyone's nemesis. Your problem is the 1 in your glossary item. The BASIC code indicates that you should put a Control-A rather than a 1 in the glossary.

The BASIC function CHR$(n) prints the ASCII character *n*. ASCII characters 31 and below are control codes, and you type them from the keyboard by holding the Control key down and pressing the second key.

The other problem you may be having is in entering the ESC (ASCII 27) character into Apple Writer. Normally, you can't enter ESC as a character in Apple Writer. You must bracket your printer codes with Control-Vs to indicate that the characters between the Control-Vs are to be taken as ASCII codes.

Glossary entries are not different from direct entries; they must include the Control-Vs, or Apple Writer will misinterpret the entry.

I am fairly certain your glossary item should read Control-V ESC W Control-A Control-V. To turn the double width off, use Control-V ESC W Control-@ Control-V.

To determine the correct codes for a printer, be sure you consider how the program sends the codes and make certain you enter the codes in a way the program understands. Experiment. The worst you will do is ruin a few pieces of paper. ✚

Please send your questions and problems to Rescue Squad, A+, 11 Davis Drive, Belmont, CA 94002.

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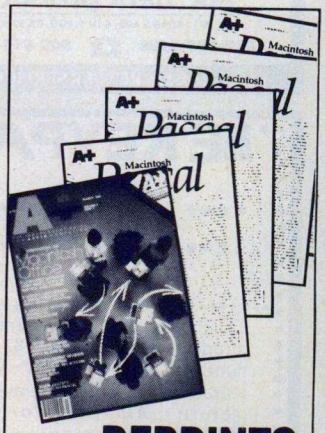

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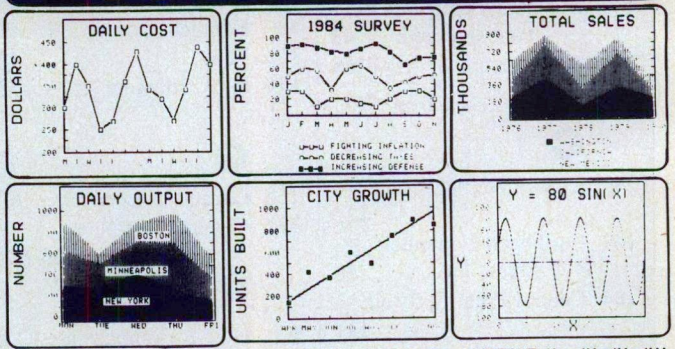

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Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 6 months.

	(1.) Own	**(2.)** Plan to Buy
Apple II	A	H
Apple IIc	B	I
Apple *II*e	C	J
Lisa	D	K
Macintosh	E	L
Other (specify)	F	M
None	G	N

Please indicate which of the following peripherals you plan to buy in the next 6 months. Then, for each one that you plan to buy, please indicate when this purchase will most likely be made.

	(3.) Plan to Buy	**(4.)** 1-3 Months	**(5.) 4-6** Months
Printer	O	V	3
Modem	P	W	4
Disk Drive—Hard	Q	X	5
Disk Drive—Floppy	R	Y	6
Monitor—Black & White	S	Z	7
Monitor—Color	T	1	8

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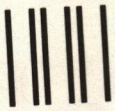

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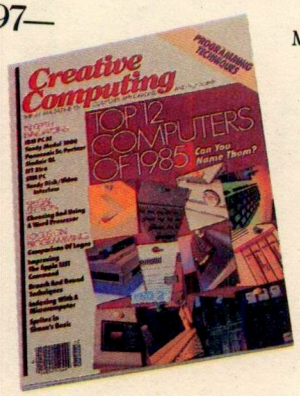

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